



SEQUENCE LISTING.ST25.txt
SEQUENCE LISTING

<110> DeAngelis, Paul

Jing, Wei

<120> TARGETED GLYCOSAMINOGLYCAN POLYMERS BY POLYMER GRAFTING AND
METHODS OF MAKING AND USING SAME

<130> 3554.097

<140> 10/642,248

<141> 2003-08-15

<150> 60/404,356

<151> 2002-08-16

<150> 60/479,432

<151> 2003-06-18

<150> 60/491,362

<151> 2003-07-31

<150> 10/195,908

<151> 2002-07-15

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<150> 09/437,277

<151> 1999-11-01

<150> 60/107,929

<151> 1998-11-11

<150> 09/283,402

<151> 1999-04-01

<150> 60/080,414

<151> 1998-04-02

<150> 09/842,484

<151> 2001-04-25

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<150> 10/142,143

<151> 2002-05-08

<150> 60/289,554

<151> 2001-05-08

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<160> 71

<170> PatentIn version 3.1

<210> 1

<211> 2920

<212> DNA

<213> Pasteurella multocida

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aaagaagaaa aagtcaatgt ttgcgatagt ccgtagata ttgcaacaca actgttaactt
240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg
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aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca
360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

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tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
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SEQUENCE LISTING.ST25.txt

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720

gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat
780

gttgcagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat
840

acacaacata ttgacccaaa agactttcta aataacgcga gtttgcttga atcattacca
900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

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1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac
1140

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1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
1260

gtcccttata tctatagaaa actttttacca atagaagatt cgcatatcaa tagagtacct
1320

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agtgcaactga atcagactgt tgttgatctc gaggtttgta tttgtaacga tggttcaaca
1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggt acgcatcatg
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SEQUENCE LISTING.ST25.txt

1560

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1680

aatccggatg gtagcttaat cgctaattgg tacaattggc cagaattttc acgagaaaaa
1740

ctcacaacgg ctatgattgc tcaccacttt agaattgtca cgattagagc ttggcattta
1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatggt cctcaaactc
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1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
2040

gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta
2100

aaagatatata aaatcatcca gaataaagat gccaaaatcg cagtcagtat tttttatccc
2160

aatacattaa acggcttagt gaaaaaacta aacaatatta ttgaatataa taaaaatata
2220

ttcgttattg ttctacatgt tgataagaat catcttacac cagatatcaa aaaagaaata
2280

ctagccttct atcataaaca tcaagtgaat attttactaa ataatgatat ctcatattac
2340

acgagtaata gattaataaa aactgaggcg catttaagta atattaataa attaagtcag
2400

ttaaatctaa attgtgaata catcattttt gataatcatg acagcctatt cgttaaaaat
2460

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SEQUENCE LISTING.ST25.txt

2520

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2640

tatgcgctag cgcgatgagct tctgacgatt attaaagaag tcatcacatc ttgccagtca
2700

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2760

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<210> 2

<211> 972

<212> PRT

<213> Pasteurella multocida

<400> 2

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			20					25						30	

Lys	Ile	Val	Glu	Phe	Gln	Ile	Thr	Lys	Cys	Lys	Glu	Lys	Leu	Ser	Ala
		35					40					45			

SEQUENCE LISTING.ST25.txt

His	Pro	Ser	Val	Asn	Ser	Ala	His	Leu	Ser	Val	Asn	Lys	Glu	Glu	Lys
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Val	Asn	Val	Cys	Asp	Ser	Pro	Leu	Asp	Ile	Ala	Thr	Gln	Leu	Leu	Leu
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Ser	Asn	Val	Lys	Lys	Leu	Val	Leu	Ser	Asp	Ser	Glu	Lys	Asn	Thr	Leu
				85					90					95	
Lys	Asn	Lys	Trp	Lys	Leu	Leu	Thr	Glu	Lys	Lys	Ser	Glu	Asn	Ala	Glu
			100					105					110		
Val	Arg	Ala	Val	Ala	Leu	Val	Pro	Lys	Asp	Phe	Pro	Lys	Asp	Leu	Val
		115					120					125			
Leu	Ala	Pro	Leu	Pro	Asp	His	Val	Asn	Asp	Phe	Thr	Trp	Tyr	Lys	Lys
	130					135					140				
Arg	Lys	Lys	Arg	Leu	Gly	Ile	Lys	Pro	Glu	His	Gln	His	Val	Gly	Leu
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Ser	Ile	Ile	Val	Thr	Thr	Phe	Asn	Arg	Pro	Ala	Ile	Leu	Ser	Ile	Thr
				165					170					175	
Leu	Ala	Cys	Leu	Val	Asn	Gln	Lys	Thr	His	Tyr	Pro	Phe	Glu	Val	Ile
			180					185					190		
Val	Thr	Asp	Asp	Gly	Ser	Gln	Glu	Asp	Leu	Ser	Pro	Ile	Ile	Arg	Gln
		195					200					205			
Tyr	Glu	Asn	Lys	Leu	Asp	Ile	Arg	Tyr	Val	Arg	Gln	Lys	Asp	Asn	Gly
	210					215					220				
Phe	Gln	Ala	Ser	Ala	Ala	Arg	Asn	Met	Gly	Leu	Arg	Leu	Ala	Lys	Tyr
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SEQUENCE LISTING.ST25.txt

Asp Phe Ile Gly Leu Leu Asp Cys Asp Met Ala Pro Asn Pro Leu Trp
245 250 255

Val His Ser Tyr Val Ala Glu Leu Leu Glu Asp Asp Asp Leu Thr Ile
260 265 270

Ile Gly Pro Arg Lys Tyr Ile Asp Thr Gln His Ile Asp Pro Lys Asp
275 280 285

Phe Leu Asn Asn Ala Ser Leu Leu Glu Ser Leu Pro Glu Val Lys Thr
290 295 300

Asn Asn Ser Val Ala Ala Lys Gly Glu Gly Thr Val Ser Leu Asp Trp
305 310 315 320

Arg Leu Glu Gln Phe Glu Lys Thr Glu Asn Leu Arg Leu Ser Asp Ser
325 330 335

Pro Phe Arg Phe Phe Ala Ala Gly Asn Val Ala Phe Ala Lys Lys Trp
340 345 350

Leu Asn Lys Ser Gly Phe Phe Asp Glu Glu Phe Asn His Trp Gly Gly
355 360 365

Glu Asp Val Glu Phe Gly Tyr Arg Leu Phe Arg Tyr Gly Ser Phe Phe
370 375 380

Lys Thr Ile Asp Gly Ile Met Ala Tyr His Gln Glu Pro Pro Gly Lys
385 390 395 400

Glu Asn Glu Thr Asp Arg Glu Ala Gly Lys Asn Ile Thr Leu Asp Ile
405 410 415

Met Arg Glu Lys Val Pro Tyr Ile Tyr Arg Lys Leu Leu Pro Ile Glu
420 425 430

SEQUENCE LISTING.ST25.txt

Asp Ser His Ile Asn Arg Val Pro Leu Val Ser Ile Tyr Ile Pro Ala
435 440 445

Tyr Asn Cys Ala Asn Tyr Ile Gln Arg Cys Val Asp Ser Ala Leu Asn
450 455 460

Gln Thr Val Val Asp Leu Glu Val Cys Ile Cys Asn Asp Gly Ser Thr
465 470 475 480

Asp Asn Thr Leu Glu Val Ile Asn Lys Leu Tyr Gly Asn Asn Pro Arg
485 490 495

Val Arg Ile Met Ser Lys Pro Asn Gly Gly Ile Ala Ser Ala Ser Asn
500 505 510

Ala Ala Val Ser Phe Ala Lys Gly Tyr Tyr Ile Gly Gln Leu Asp Ser
515 520 525

Asp Asp Tyr Leu Glu Pro Asp Ala Val Glu Leu Cys Leu Lys Glu Phe
530 535 540

Leu Lys Asp Lys Thr Leu Ala Cys Val Tyr Thr Thr Asn Arg Asn Val
545 550 555 560

Asn Pro Asp Gly Ser Leu Ile Ala Asn Gly Tyr Asn Trp Pro Glu Phe
565 570 575

Ser Arg Glu Lys Leu Thr Thr Ala Met Ile Ala His His Phe Arg Met
580 585 590

Phe Thr Ile Arg Ala Trp His Leu Thr Asp Gly Phe Asn Glu Lys Ile
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Glu Asn Ala Val Asp Tyr Asp Met Phe Leu Lys Leu Ser Glu Val Gly
610 615 620

SEQUENCE LISTING.ST25.txt

Lys Phe Lys His Leu Asn Lys Ile Cys Tyr Asn Arg Val Leu His Gly
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Asp Asn Thr Ser Ile Lys Lys Leu Gly Ile Gln Lys Lys Asn His Phe
645 650 655

Val Val Val Asn Gln Ser Leu Asn Arg Gln Gly Ile Thr Tyr Tyr Asn
660 665 670

Tyr Asp Glu Phe Asp Asp Leu Asp Glu Ser Arg Lys Tyr Ile Phe Asn
675 680 685

Lys Thr Ala Glu Tyr Gln Glu Glu Ile Asp Ile Leu Lys Asp Ile Lys
690 695 700

Ile Ile Gln Asn Lys Asp Ala Lys Ile Ala Val Ser Ile Phe Tyr Pro
705 710 715 720

Asn Thr Leu Asn Gly Leu Val Lys Lys Leu Asn Asn Ile Ile Glu Tyr
725 730 735

Asn Lys Asn Ile Phe Val Ile Val Leu His Val Asp Lys Asn His Leu
740 745 750

Thr Pro Asp Ile Lys Lys Glu Ile Leu Ala Phe Tyr His Lys His Gln
755 760 765

Val Asn Ile Leu Leu Asn Asn Asp Ile Ser Tyr Tyr Thr Ser Asn Arg
770 775 780

Leu Ile Lys Thr Glu Ala His Leu Ser Asn Ile Asn Lys Leu Ser Gln
785 790 795 800

Leu Asn Leu Asn Cys Glu Tyr Ile Ile Phe Asp Asn His Asp Ser Leu
805 810 815

SEQUENCE LISTING.ST25.txt

Phe Val Lys Asn Asp Ser Tyr Ala Tyr Met Lys Lys Tyr Asp Val Gly
820 825 830

Met Asn Phe Ser Ala Leu Thr His Asp Trp Ile Glu Lys Ile Asn Ala
835 840 845

His Pro Pro Phe Lys Lys Leu Ile Lys Thr Tyr Phe Asn Asp Asn Asp
850 855 860

Leu Lys Ser Met Asn Val Lys Gly Ala Ser Gln Gly Met Phe Met Thr
865 870 875 880

Tyr Ala Leu Ala His Glu Leu Leu Thr Ile Ile Lys Glu Val Ile Thr
885 890 895

Ser Cys Gln Ser Ile Asp Ser Val Pro Glu Tyr Asn Thr Glu Asp Ile
900 905 910

Trp Phe Gln Phe Ala Leu Leu Ile Leu Glu Lys Lys Thr Gly His Val
915 920 925

Phe Asn Lys Thr Ser Thr Leu Thr Tyr Met Pro Trp Glu Arg Lys Leu
930 935 940

Gln Trp Thr Asn Glu Gln Ile Glu Ser Ala Lys Arg Gly Glu Asn Ile
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Pro Val Asn Lys Phe Ile Ile Asn Ser Ile Thr Leu
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<210> 3

<211> 2979

<212> DNA

<213> Pasteurella multocida

SEQUENCE LISTING.ST25.txt

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180

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360

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420

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540

aatcgtagcc gtatttttaga tataacgtta gcctgtttgg tcaatcagaa aacaaactac
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ccatttgaag tcgttggtgc agatgatggg agtaaggaaa acttacttac cattgtgcaa
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tgtgcagtca gaaacttagg ttacgtaca gcaaagtatg attttgtctc gattctagac
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tgcgatatgg caccacaaca attatgggtt cattcttatt ttacagaact attagaagac
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SEQUENCE LISTING.ST25.txt

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1020

accgataatc tacgtctatg tgattctccg tttcggttatt ttagttgcgg taatgttgca
1080

ttttctaaag aatggctaaa taaagtaggt tggttcgatg aagaatttaa tcattggggg
1140

ggcgaagatg tagaatttgg ttacagatta tttgccaaag gctgtttttt cagagtaatt
1200

gacggcgga tggcatacca tcaagaacca cctggtaaag aaaatgaaac agaccgcgaa
1260

gctggtaaaa gtattacgct taaaattgtg aaagaaaagg taccttacat ctatagaaag
1320

cttttaccaa tagaagattc acatattcat agaatacctt tagtttctat ttatatcccc
1380

gcttataact gtgcaaatta tattcaaaga tgtgtagata gtgctcttaa tcaaactggt
1440

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1500

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1620

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1680

aaaacgctag ctgtgtttta taccactaat agaaacgtca atccggatgg tagcttaatc
1740

gctaattggtt acaattggcc agaattttca cgagaaaaac tcacaacggc tatgattgct
1800

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1860

SEQUENCE LISTING.ST25.txt

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1980

ctcggcattc aaaagaaaaa ccattttggt gtagtcaatc agtcattaaa tagacaaggc
2040

atcaattatt ataattatga caaatttgat gatttagatg aaagtagaaa gtatatcttc
2100

aataaaaccg ctgaatatca agaagaaatg gatattttta aagatcttaa actcattcaa
2160

aataaagatg ccaaaatcgc agtcagtatt ttctatccca atacattaaa cggcttagtg
2220

aaaaaactaa acaatattat tgaatataat aaaaatatat tcgttattat tctacatggt
2280

gataagaatc atcttacacc agacatcaaa aaagaaatat tggctttcta tcataagcac
2340

caagtgaata ttttactaaa taatgacatc tcatattaca cgagtaatag actaataaaa
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2520

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2580

gcgcatccac catttaaaaa gctgattaaa acctatttta atgacaatga cttaagaagt
2640

atgaatgtga aaggggcatc acaaggatg tttatgaagt atgcgctacc gcatgagctt
2700

ctgacgatta ttaaagaagt catcacatcc tgccaatcaa ttgatagtgt gccagaatat
2760

aacactgagg atatttggtt ccaatttgca cttttaatct tagaaaagaa aaccggccat
2820

SEQUENCE LISTING.ST25.txt

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<210> 4

<211> 965

<212> PRT

<213> Pasteurella multocida

<400> 4

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			20					25						30	

Lys	Ile	Val	Glu	Phe	Gln	Ile	Ile	Lys	Cys	Lys	Glu	Lys	Leu	Ser	Thr
		35					40					45			

Asn	Ser	Tyr	Val	Ser	Glu	Asp	Lys	Lys	Asn	Ser	Val	Cys	Asp	Ser	Ser
	50					55					60				

Leu	Asp	Ile	Ala	Thr	Gln	Leu	Leu	Leu	Ser	Asn	Val	Lys	Lys	Leu	Thr
65					70					75					80

Leu	Ser	Glu	Ser	Glu	Lys	Asn	Ser	Leu	Lys	Asn	Lys	Trp	Lys	Ser	Ile
				85					90					95	

Thr	Gly	Lys	Lys	Ser	Glu	Asn	Ala	Glu	Ile	Arg	Lys	Val	Glu	Leu	Val
			100					105					110		

SEQUENCE LISTING.ST25.txt

Pro Lys Asp Phe Pro Lys Asp Leu Val Leu Ala Pro Leu Pro Asp His
115 120 125

Val Asn Asp Phe Thr Trp Tyr Lys Asn Arg Lys Lys Ser Leu Gly Ile
130 135 140

Lys Pro Val Asn Lys Asn Ile Gly Leu Ser Ile Ile Ile Pro Thr Phe
145 150 155 160

Asn Arg Ser Arg Ile Leu Asp Ile Thr Leu Ala Cys Leu Val Asn Gln
165 170 175

Lys Thr Asn Tyr Pro Phe Glu Val Val Val Ala Asp Asp Gly Ser Lys
180 185 190

Glu Asn Leu Leu Thr Ile Val Gln Lys Tyr Glu Gln Lys Leu Asp Ile
195 200 205

Lys Tyr Val Arg Gln Lys Asp Tyr Gly Tyr Gln Leu Cys Ala Val Arg
210 215 220

Asn Leu Gly Leu Arg Thr Ala Lys Tyr Asp Phe Val Ser Ile Leu Asp
225 230 235 240

Cys Asp Met Ala Pro Gln Gln Leu Trp Val His Ser Tyr Leu Thr Glu
245 250 255

Leu Leu Glu Asp Asn Asp Ile Val Leu Ile Gly Pro Arg Lys Tyr Val
260 265 270

Asp Thr His Asn Ile Thr Ala Glu Gln Phe Leu Asn Asp Pro Tyr Leu
275 280 285

Ile Glu Ser Leu Pro Glu Thr Ala Thr Asn Asn Asn Pro Ser Ile Thr
290 295 300

SEQUENCE LISTING.ST25.txt

Ser Lys Gly Asn Ile Ser Leu Asp Trp Arg Leu Glu His Phe Lys Lys
305 310 315 320

Thr Asp Asn Leu Arg Leu Cys Asp Ser Pro Phe Arg Tyr Phe Ser Cys
325 330 335

Gly Asn Val Ala Phe Ser Lys Glu Trp Leu Asn Lys Val Gly Trp Phe
340 345 350

Asp Glu Glu Phe Asn His Trp Gly Gly Glu Asp Val Glu Phe Gly Tyr
355 360 365

Arg Leu Phe Ala Lys Gly Cys Phe Phe Arg Val Ile Asp Gly Gly Met
370 375 380

Ala Tyr His Gln Glu Pro Pro Gly Lys Glu Asn Glu Thr Asp Arg Glu
385 390 395 400

Ala Gly Lys Ser Ile Thr Leu Lys Ile Val Lys Glu Lys Val Pro Tyr
405 410 415

Ile Tyr Arg Lys Leu Leu Pro Ile Glu Asp Ser His Ile His Arg Ile
420 425 430

Pro Leu Val Ser Ile Tyr Ile Pro Ala Tyr Asn Cys Ala Asn Tyr Ile
435 440 445

Gln Arg Cys Val Asp Ser Ala Leu Asn Gln Thr Val Val Asp Leu Glu
450 455 460

Val Cys Ile Cys Asn Asp Gly Ser Thr Asp Asn Thr Leu Glu Val Ile
465 470 475 480

Asn Lys Leu Tyr Gly Asn Asn Pro Arg Val Arg Ile Met Ser Lys Pro
485 490 495

SEQUENCE LISTING.ST25.txt

Asn	Gly	Gly	Ile	Ala	Ser	Ala	Ser	Asn	Ala	Ala	Val	Ser	Phe	Ala	Lys	500	505	510
Gly	Tyr	Tyr	Ile	Gly	Gln	Leu	Asp	Ser	Asp	Asp	Tyr	Leu	Glu	Pro	Asp	515	520	525
Ala	Val	Glu	Leu	Cys	Leu	Lys	Glu	Phe	Leu	Lys	Asp	Lys	Thr	Leu	Ala	530	535	540
Cys	Val	Tyr	Thr	Thr	Asn	Arg	Asn	Val	Asn	Pro	Asp	Gly	Ser	Leu	Ile	545	550	555
Ala	Asn	Gly	Tyr	Asn	Trp	Pro	Glu	Phe	Ser	Arg	Glu	Lys	Leu	Thr	Thr	565	570	575
Ala	Met	Ile	Ala	His	His	Phe	Arg	Met	Phe	Thr	Ile	Arg	Ala	Trp	His	580	585	590
Leu	Thr	Asp	Gly	Phe	Asn	Glu	Asn	Ile	Glu	Asn	Ala	Val	Asp	Tyr	Asp	595	600	605
Met	Phe	Leu	Lys	Leu	Ser	Glu	Val	Gly	Lys	Phe	Lys	His	Leu	Asn	Lys	610	615	620
Ile	Cys	Tyr	Asn	Arg	Val	Leu	His	Gly	Asp	Asn	Thr	Ser	Ile	Lys	Lys	625	630	635
Leu	Gly	Ile	Gln	Lys	Lys	Asn	His	Phe	Val	Val	Val	Asn	Gln	Ser	Leu	645	650	655
Asn	Arg	Gln	Gly	Ile	Asn	Tyr	Tyr	Asn	Tyr	Asp	Lys	Phe	Asp	Asp	Leu	660	665	670
Asp	Glu	Ser	Arg	Lys	Tyr	Ile	Phe	Asn	Lys	Thr	Ala	Glu	Tyr	Gln	Glu	675	680	685

SEQUENCE LISTING.ST25.txt

Glu Met Asp Ile Leu Lys Asp Leu Lys Leu Ile Gln Asn Lys Asp Ala
690 695 700

Lys Ile Ala Val Ser Ile Phe Tyr Pro Asn Thr Leu Asn Gly Leu Val
705 710 715 720

Lys Lys Leu Asn Asn Ile Ile Glu Tyr Asn Lys Asn Ile Phe Val Ile
725 730 735

Ile Leu His Val Asp Lys Asn His Leu Thr Pro Asp Ile Lys Lys Glu
740 745 750

Ile Leu Ala Phe Tyr His Lys His Gln Val Asn Ile Leu Leu Asn Asn
755 760 765

Asp Ile Ser Tyr Tyr Thr Ser Asn Arg Leu Ile Lys Thr Glu Ala His
770 775 780

Leu Ser Asn Ile Asn Lys Leu Ser Gln Leu Asn Leu Asn Cys Glu Tyr
785 790 795 800

Ile Ile Phe Asp Asn His Asp Ser Leu Phe Val Lys Asn Asp Ser Tyr
805 810 815

Ala Tyr Met Lys Lys Tyr Asp Val Gly Met Asn Phe Ser Ala Leu Thr
820 825 830

His Asp Trp Ile Glu Lys Ile Asn Ala His Pro Pro Phe Lys Lys Leu
835 840 845

Ile Lys Thr Tyr Phe Asn Asp Asn Asp Leu Arg Ser Met Asn Val Lys
850 855 860

Gly Ala Ser Gln Gly Met Phe Met Lys Tyr Ala Leu Pro His Glu Leu
865 870 875 880

SEQUENCE LISTING.ST25.txt

Leu Thr Ile Ile Lys Glu Val Ile Thr Ser Cys Gln Ser Ile Asp Ser
885 890 895

Val Pro Glu Tyr Asn Thr Glu Asp Ile Trp Phe Gln Phe Ala Leu Leu
900 905 910

Ile Leu Glu Lys Lys Thr Gly His Val Phe Asn Lys Thr Ser Thr Leu
915 920 925

Thr Tyr Met Pro Trp Glu Arg Lys Leu Gln Trp Thr Asn Glu Gln Ile
930 935 940

Gln Ser Ala Lys Lys Gly Glu Asn Ile Pro Val Asn Lys Phe Ile Ile
945 950 955 960

Asn Ser Ile Thr Leu
965

<210> 5

<211> 1851

<212> DNA

<213> Pasteurella multocida

<400> 5

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60

actctatatg aaaatatagc taaaatttat gggttcagaaa gccttggttaa atataatatt
120

gatatatgta aaaaaaatat aacacaatca aaaagtaata aaatagaaga agataatatt
180

tctggagaaa acaaattttc agtatcaata aaagatctat ataacgaaat aagcaatagt
240

SEQUENCE LISTING.ST25.txt

gaattaggga ttacaaaaga aagactagga gccccccctc tagtcagtat tataatgact
300

tctcataata cagaaaaatt cattgaagcc tcaattaatt cactattatt gcaaacatac
360

aataacttag aagttatcgt tgtagatgat tatagcacag ataaaacatt tcagatcgca
420

tccagaatag caaactctac aagtaaagta aaaacattcc gattaaactc aaatctaggg
480

acatactttg cgaaaaatac aggaatttta aagtctaaag gagatattat tttctttcag
540

gatagcgatg atgtatgtca ccatgaaaga atcgaaagat gtgttaatgc attattatcg
600

aataaagata atatagctgt tagatgtgca tattctagaa taaatctaga aacacaaaat
660

ataataaaag ttaatgataa taaatacaaa ttaggattaa taactttagg cgtttataga
720

aaagtattta atgaaattgg tttttttaac tgcacaacca aagcatcgga tgatgaattt
780

tatcatagaa taattaaata ctatggtaaa aataggataa ataacttatt tctaccactg
840

tattataaca caatgcgtga agattcatta ttttctgata tggttgagtg ggtagatgaa
900

aataatataa agcaaaaaac ctctgatgct agacaaaatt atctccatga attccaaaaa
960

atacacaatg aaaggaaatt aaatgaatta aaagagattt ttagctttcc tagaattcat
1020

gacgccttac ctatatcaaa agaaatgagt aagctcagca accctaaaat tcctgtttat
1080

ataaatatat gctcaatacc ttcaagaata aaacaacttc aatacactat tggagtacta
1140

aaaaccaat gcgatcattt tcatatttat cttgatggat atccagaagt acctgatttt
1200

SEQUENCE LISTING.ST25.txt

ataaaaaaac tagggaataa agcgaccgtt attaattgtc aaaacaaaaa tgagtctatt
1260

agagataatg gaaagtttat tctattagaa aaacttataa aggaaaataa agatggatat
1320

tatataactt gtgatgatga tatccggtat cctgctgact acacaaacac tatgataaaa
1380

aaaattaata aatacaatga taaagcagca attggattac atgggtgttat attcccaagt
1440

agagtcaaca agtatTTTTc atcagacaga attgtctata atTTTcaaaa acctttagaa
1500

aatgatactg ctgtaaatat attaggaact ggaactgttg cctttagagt atctatTTTT
1560

aataaatTTT ctctatctga tTTtgagcat cctggcatgg tagatatcta tTTTctata
1620

ctatgtaaga aaaacaatat actccaagtt tgtatatcac gaccatcgaa ttggctaaca
1680

gaagataaca aaaacactga gaccttattt catgaattcc aaaatagaga tgaaatacaa
1740

agtaaactca ttatTTTcaaa caacccttgg ggataactcaa gtatatatcc actattaaat
1800

aataatgcta attattctga acttattccg tgTTTatctt tttataacga g
1851

<210> 6

<211> 615

<212> PRT

<213> Pasteurella multocida

<400> 6

Met Ser Leu Phe Lys Arg Ala Thr Glu Leu Phe Lys Ser Gly Asn Tyr

SEQUENCE LISTING.ST25.txt

1	5	10	15
Lys Asp Ala Leu Thr Leu Tyr Glu Asn Ile Ala Lys Ile Tyr Gly Ser	20	25	30
Glu Ser Leu Val Lys Tyr Asn Ile Asp Ile Cys Lys Lys Asn Ile Thr	35	40	45
Gln Ser Lys Ser Asn Lys Ile Glu Glu Asp Asn Ile Ser Gly Glu Asn	50	55	60
Lys Phe Ser Val Ser Ile Lys Asp Leu Tyr Asn Glu Ile Ser Asn Ser	65	70	75
Glu Leu Gly Ile Thr Lys Glu Arg Leu Gly Ala Pro Pro Leu Val Ser	85	90	95
Ile Ile Met Thr Ser His Asn Thr Glu Lys Phe Ile Glu Ala Ser Ile	100	105	110
Asn Ser Leu Leu Leu Gln Thr Tyr Asn Leu Glu Val Ile Val Val Asp	115	120	125
Asp Tyr Ser Thr Asp Lys Thr Phe Gln Ile Ala Ser Arg Ile Ala Asn	130	135	140
Ser Thr Ser Lys Val Lys Thr Phe Arg Leu Asn Ser Asn Leu Gly Thr	145	150	155
Tyr Phe Ala Lys Asn Thr Gly Ile Leu Lys Ser Lys Gly Asp Ile Ile	165	170	175
Phe Phe Gln Ser Asp Asp Val Cys His His Glu Arg Ile Glu Arg Cys	180	185	190
Val Asn Ala Leu Leu Ser Asn Lys Asp Asn Ile Ala Val Arg Cys Ala			

SEQUENCE LISTING.ST25.txt

195

200

205

Tyr Ser Arg Ile Asn Leu Glu Thr Gln Asn Ile Ile Lys Val Asn Asp
210 215 220

Asn Lys Tyr Lys Leu Gly Leu Ile Thr Leu Gly Val Tyr Arg Lys Val
225 230 235 240

Phe Asn Glu Ile Gly Phe Phe Asn Cys Thr Thr Lys Ala Ser Asp Asp
245 250 255

Glu Phe Tyr His Arg Ile Ile Lys Tyr Tyr Gly Lys Asn Arg Ile Asn
260 265 270

Asn Leu Phe Leu Pro Leu Tyr Tyr Asn Thr Met Arg Glu Asp Ser Leu
275 280 285

Phe Ser Asp Met Val Glu Trp Val Asp Glu Asn Asn Ile Lys Gln Lys
290 295 300

Thr Ser Asp Ala Arg Gln Asn Tyr Leu His Glu Phe Gln Lys Ile His
305 310 315 320

Asn Glu Arg Lys Leu Asn Glu Leu Lys Glu Ile Phe Ser Phe Pro Arg
325 330 335

Ile His Asp Ala Leu Pro Ile Ser Lys Glu Met Ser Lys Leu Ser Asn
340 345 350

Pro Lys Ile Pro Val Tyr Ile Asn Ile Cys Ser Ile Pro Ser Arg Ile
355 360 365

Lys Gln Leu Gln Tyr Thr Ile Gly Val Leu Lys Asn Gln Cys Asp His
370 375 380

Phe His Ile Tyr Leu Asp Gly Tyr Pro Glu Val Pro Asp Phe Ile Lys

385 390 395 400

SEQUENCE LISTING.ST25.txt

580

585

590

Ile Tyr Pro Leu Leu Asn Asn Asn Ala Asn Tyr Ser Glu Leu Ile Pro
595 600 605

Cys Leu Ser Phe Tyr Asn Glu
610 615

<210> 7

<211> 1940

<212> DNA

<213> Pasteurella multocida

<400> 7

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120

gatgatagag tgtttcgctg tctctattat cttccgtag ccagtttgct ggtcttgaaa
180

tacaaatctg aagaatatta tttttcttac acaagagaga gaaatagata tcagccatgc
240

ctgaatgggt aaagtcagaa agagaaaatt gattaaagag actgactcta aagctaacag
300

ttcctgtacc taatacattg accgctttgt ctttttccag aggtttatag aagctatata
360

ccagtctatc cgccgaaaaa tatttggtca ttctacttgg aaagagaatg ccgtgtaaac
420

caataaccgc tttatcatcg tattcattca gcttcttgat catcgtattg atgtaatcgc
480

ttggatagat aatgtcatca tcacaggtta tataatatcc atcttgattt ttttcaatca
540

SEQUENCE LISTING.ST25.txt

actcttccag taaaatgaat ttgccattat ctctaataga gttatcttta tctttgcaat
600

gaacaacggt tgctttatta cctaaatttt ttatgaagtc agggatttct acatagccat
660

caagataaat atgaaaatga tcacattgat tttttagtat gccgataata cgtcgtaatt
720

gcgctattct tgagggaata gaacaaatat tgatataaac aggaatctta ggattggaca
780

acttactcat ttcttgtggt actggtaagg catcgtaaata acgagggaat tgaaaaagat
840

ttttgaaatc atgtgaggca gtttcgttat gcatcgcttg aaacagggtt gcataatggt
900

gtctggtatc agacattttc tgtattatgt tatgattgtc tatccattca accatatcag
960

taaataaaga gttttctctc attgtgttgt agtataacgg caagagtaaa ttttttattt
1020

tttcttttcc ataatatattc gcaattctat gaaaaaactc atcatctgag ccttttagtcg
1080

tacaattgaa gaaaccaatt tcttgaaata cttttctgtg cataccaag gttataaaac
1140

ctaattctata atccatatta ttgactttaa tgatatgttg tgtttctggt gctagtcttg
1200

agtatgcaca acgaacagca atagtttctt tattagctaa taatatattt acacatcttt
1260

ctattctttc atgatgacat acatcatcac tatcttgaaa gaaaataatg tcaccttttag
1320

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1380

ctctgacttt gcttggttga ttcgctattc tcgaggcaat ttcaaagtga ttatccgagc
1440

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1500

SEQUENCE LISTING.ST25.txt

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1560

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1620

ctgttattga tgttggttgc ttatcttttt ctagctttgc ttctaattgct tgattatagg
1680

tatatatttt ttcaaattct tgcagaacca attggagttg ttttaataaa agtttatttt
1740

cgttttcaag ggatgcggat agcggatgtt tactgtcctg ttttgccaat aaagtttggt
1800

gagaaataat gtctttgttt aaagttgttt ttagactatc aattttattt tgaaagggtg
1860

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1920

ctttttttct cttcatttca
1940

<210> 8

<211> 651

<212> PRT

<213> Pasteurella multocida

<400> 8

Met	Lys	Arg	Lys	Lys	Glu	Met	Thr	Gln	Lys	Gln	Met	Thr	Lys	Asn	Pro
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Pro	Gln	His	Glu	Lys	Glu	Asn	Glu	Leu	Asn	Thr	Phe	Gln	Asn	Lys	Ile
			20					25					30		

Asp	Ser	Leu	Lys	Thr	Thr	Leu	Asn	Lys	Asp	Ile	Ile	Ser	Gln	Gln	Thr
		35					40					45			

SEQUENCE LISTING.ST25.txt

Leu	Leu	Ala	Lys	Gln	Asp	Ser	Lys	His	Pro	Leu	Ser	Ala	Ser	Leu	Glu
50						55					60				
Asn	Glu	Asn	Lys	Leu	Leu	Leu	Lys	Gln	Leu	Gln	Leu	Val	Leu	Gln	Glu
65					70					75					80
Phe	Glu	Lys	Ile	Tyr	Thr	Tyr	Asn	Gln	Ala	Leu	Glu	Ala	Lys	Leu	Glu
			85						90					95	
Lys	Asp	Lys	Gln	Thr	Thr	Ser	Ile	Thr	Asp	Leu	Tyr	Asn	Glu	Val	Ala
			100					105					110		
Lys	Ser	Asp	Leu	Gly	Leu	Val	Lys	Glu	Thr	Asn	Ser	Val	Asn	Pro	Leu
		115					120					125			
Val	Ser	Ile	Ile	Met	Thr	Ser	His	Asn	Thr	Ala	Gln	Phe	Ile	Glu	Ala
130						135					140				
Ser	Ile	Asn	Ser	Leu	Leu	Leu	Gln	Thr	Tyr	Lys	Asn	Ile	Glu	Ile	Ile
145					150					155					160
Ile	Val	Asp	Asp	Asp	Ser	Ser	Asp	Asn	Thr	Phe	Glu	Ile	Ala	Ser	Arg
				165					170					175	
Ile	Ala	Asn	Thr	Thr	Ser	Lys	Val	Arg	Val	Phe	Arg	Leu	Asn	Ser	Asn
			180					185					190		
Leu	Gly	Thr	Tyr	Phe	Ala	Lys	Asn	Thr	Gly	Ile	Leu	Lys	Ser	Lys	Gly
		195					200					205			
Asp	Ile	Ile	Phe	Phe	Gln	Asp	Ser	Asp	Asp	Val	Cys	His	His	Glu	Arg
	210					215					220				
Ile	Glu	Arg	Cys	Val	Asn	Ile	Leu	Leu	Ala	Asn	Lys	Glu	Thr	Ile	Ala
225					230					235					240

SEQUENCE LISTING.ST25.txt

Val	Arg	Cys	Ala	Tyr	Ser	Arg	Leu	Ala	Pro	Glu	Thr	Gln	His	Ile	Ile	
				245					250					255		
Lys	Val	Asn	Asn	Met	Asp	Tyr	Arg	Leu	Gly	Phe	Ile	Thr	Leu	Gly	Met	
			260					265					270			
His	Arg	Lys	Val	Phe	Gln	Glu	Ile	Gly	Phe	Phe	Asn	Cys	Thr	Thr	Lys	
		275					280					285				
Gly	Ser	Asp	Asp	Glu	Phe	Phe	His	Arg	Ile	Ala	Lys	Tyr	Tyr	Gly	Lys	
	290						295				300					
Glu	Lys	Ile	Lys	Asn	Leu	Leu	Leu	Pro	Leu	Tyr	Tyr	Asn	Thr	Met	Arg	
305					310					315					320	
Glu	Asn	Ser	Leu	Phe	Thr	Asp	Met	Val	Glu	Trp	Ile	Asp	Asn	His	Asn	
				325					330					335		
Ile	Ile	Gln	Lys	Met	Ser	Asp	Thr	Arg	Gln	His	Tyr	Ala	Thr	Leu	Phe	
			340					345						350		
Gln	Ala	Met	His	Asn	Glu	Thr	Ala	Ser	His	Asp	Phe	Lys	Asn	Leu	Phe	
		355					360					365				
Gln	Phe	Pro	Arg	Ile	Tyr	Asp	Ala	Leu	Pro	Val	Pro	Gln	Glu	Met	Ser	
	370					375					380					
Lys	Leu	Ser	Asn	Pro	Lys	Ile	Pro	Val	Tyr	Ile	Asn	Ile	Cys	Ser	Ile	
385					390					395					400	
Pro	Ser	Arg	Ile	Ala	Gln	Leu	Arg	Arg	Ile	Ile	Gly	Ile	Leu	Lys	Asn	
				405					410					415		
Gln	Cys	Asp	His	Phe	His	Ile	Tyr	Leu	Asp	Gly	Tyr	Val	Glu	Ile	Pro	
			420					425					430			

SEQUENCE LISTING.ST25.txt

Asp Phe Ile Lys Asn Leu Gly Asn Lys Ala Thr Val Val His Cys Lys
435 440 445

Asp Lys Asp Asn Ser Ile Arg Asp Asn Gly Lys Phe Ile Leu Leu Glu
450 455 460

Glu Leu Ile Glu Lys Asn Gln Asp Gly Tyr Tyr Ile Thr Cys Asp Asp
465 470 475 480

Asp Ile Ile Tyr Pro Ser Asp Tyr Ile Asn Thr Met Ile Lys Lys Leu
485 490 495

Asn Glu Tyr Asp Asp Lys Ala Val Ile Gly Leu His Gly Ile Leu Phe
500 505 510

Pro Ser Arg Met Thr Lys Tyr Phe Ser Ala Asp Arg Leu Val Tyr Ser
515 520 525

Phe Tyr Lys Pro Leu Glu Lys Asp Lys Ala Val Asn Val Leu Gly Thr
530 535 540

Gly Thr Val Ser Phe Arg Val Ser Leu Phe Asn Gln Phe Ser Leu Ser
545 550 555 560

Asp Phe Thr His Ser Gly Met Ala Asp Ile Tyr Phe Ser Leu Leu Cys
565 570 575

Lys Lys Asn Asn Ile Leu Gln Ile Cys Ile Ser Arg Pro Ala Asn Trp
580 585 590

Leu Thr Glu Asp Asn Arg Asp Ser Glu Thr Leu Tyr His Gln Tyr Arg
595 600 605

Asp Asn Asp Glu Gln Gln Thr Gln Leu Ile Met Glu Asn Gly Pro Trp
610 615 620

SEQUENCE LISTING.ST25.txt

Gly Tyr Ser Ser Ile Tyr Pro Leu Val Lys Asn His Pro Lys Phe Thr
625 630 635 640

Asp Leu Ile Pro Cys Leu Pro Phe Tyr Phe Leu
645 650

<210> 9

<211> 703

<212> PRT

<213> Pasteurella multocida

<400> 9

Met Asn Thr Leu Ser Gln Ala Ile Lys Ala Tyr Asn Ser Asn Asp Tyr
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Gln Leu Ala Leu Lys Leu Phe Glu Lys Ser Ala Glu Ile Tyr Gly Arg
20 25 30

Lys Ile Val Glu Phe Gln Ile Thr Lys Cys Lys Glu Lys Leu Ser Ala
35 40 45

His Pro Ser Val Asn Ser Ala His Leu Ser Val Asn Lys Glu Glu Lys
50 55 60

Val Asn Val Cys Asp Ser Pro Leu Asp Ile Ala Thr Gln Leu Leu Leu
65 70 75 80

Ser Asn Val Lys Lys Leu Val Leu Ser Asp Ser Glu Lys Asn Thr Leu
85 90 95

Lys Asn Lys Trp Lys Leu Leu Thr Glu Lys Lys Ser Glu Asn Ala Glu
100 105 110

SEQUENCE LISTING.ST25.txt

Val	Arg	Ala	Val	Ala	Leu	Val	Pro	Lys	Asp	Phe	Pro	Lys	Asp	Leu	Val
		115					120					125			

Leu Ala Pro Leu Pro Asp His Val Asn Asp Phe Thr Trp Tyr Lys Lys
130 135 140

Arg Lys Lys Arg Leu Gly Ile Lys Pro Glu His Gln His Val Gly Leu
145 150 155 160

Ser Ile Ile Val Thr Thr Phe Asn Arg Pro Ala Ile Leu Ser Ile Thr
165 170 175

Leu Ala Cys Leu Val Asn Gln Lys Thr His Tyr Pro Phe Glu Val Ile
180 185 190

Val Thr Asp Asp Gly Ser Gln Glu Asp Leu Ser Pro Ile Ile Arg Gln
195 200 205

Tyr Glu Asn Lys Leu Asp Ile Arg Tyr Val Arg Gln Lys Asp Asn Gly
210 215 220

Phe Gln Ala Ser Ala Ala Arg Asn Met Gly Leu Arg Leu Ala Lys Tyr
225 230 235 240

Asp Phe Ile Gly Leu Leu Asp Cys Asp Met Ala Pro Asn Pro Leu Trp
245 250 255

Val His Ser Tyr Val Ala Glu Leu Leu Glu Asp Asp Asp Leu Thr Ile
260 265 270

Ile Gly Pro Arg Lys Tyr Ile Asp Thr Gln His Ile Asp Pro Lys Asp
275 280 285

Phe Leu Asn Asn Ala Ser Leu Leu Glu Ser Leu Pro Glu Val Lys Thr
290 295 300

SEQUENCE LISTING.ST25.txt

Asn Asn Ser Val Ala Ala Lys Gly Glu Gly Thr Val Ser Leu Asp Trp
305 310 315 320

Arg Leu Glu Gln Phe Glu Lys Thr Glu Asn Leu Arg Leu Ser Asp Ser
325 330 335

Pro Phe Arg Phe Phe Ala Ala Gly Asn Val Ala Phe Ala Lys Lys Trp
340 345 350

Leu Asn Lys Ser Gly Phe Phe Asp Glu Glu Phe Asn His Trp Gly Gly
355 360 365

Glu Asp Val Glu Phe Gly Tyr Arg Leu Phe Arg Tyr Gly Ser Phe Phe
370 375 380

Lys Thr Ile Asp Gly Ile Met Ala Tyr His Gln Glu Pro Pro Gly Lys
385 390 395 400

Glu Asn Glu Thr Asp Arg Glu Ala Gly Lys Asn Ile Thr Leu Asp Ile
405 410 415

Met Arg Glu Lys Val Pro Tyr Ile Tyr Arg Lys Leu Leu Pro Ile Glu
420 425 430

Asp Ser His Ile Asn Arg Val Pro Leu Val Ser Ile Tyr Ile Pro Ala
435 440 445

Tyr Asn Cys Ala Asn Tyr Ile Gln Arg Cys Val Asp Ser Ala Leu Asn
450 455 460

Gln Thr Val Val Asp Leu Glu Val Cys Ile Cys Asn Asp Gly Ser Thr
465 470 475 480

Asp Asn Thr Leu Glu Val Ile Asn Lys Leu Tyr Gly Asn Asn Pro Arg
485 490 495

SEQUENCE LISTING.ST25.txt

Val Arg Ile Met Ser Lys Pro Asn Gly Gly Ile Ala Ser Ala Ser Asn
500 505 510

Ala Ala Val Ser Phe Ala Lys Gly Tyr Tyr Ile Gly Gln Leu Asp Ser
515 520 525

Asp Asp Tyr Leu Glu Pro Asp Ala Val Glu Leu Cys Leu Lys Glu Phe
530 535 540

Leu Lys Asp Lys Thr Leu Ala Cys Val Tyr Thr Thr Asn Arg Asn Val
545 550 555 560

Asn Pro Asp Gly Ser Leu Ile Ala Asn Gly Tyr Asn Trp Pro Glu Phe
565 570 575

Ser Arg Glu Lys Leu Thr Thr Ala Met Ile Ala His His Phe Arg Met
580 585 590

Phe Thr Ile Arg Ala Trp His Leu Thr Asp Gly Phe Asn Glu Lys Ile
595 600 605

Glu Asn Ala Val Asp Tyr Asp Met Phe Leu Lys Leu Ser Glu Val Gly
610 615 620

Lys Phe Lys His Leu Asn Lys Ile Cys Tyr Asn Arg Val Leu His Gly
625 630 635 640

Asp Asn Thr Ser Ile Lys Lys Leu Gly Ile Gln Lys Lys Asn His Phe
645 650 655

Val Val Val Asn Gln Ser Leu Asn Arg Gln Gly Ile Thr Tyr Tyr Asn
660 665 670

Tyr Asp Glu Phe Asp Asp Leu Asp Glu Ser Arg Lys Tyr Ile Phe Asn
675 680 685

SEQUENCE LISTING.ST25.txt

Lys Thr Ala Glu Tyr Gln Glu Glu Ile Asp Ile Leu Lys Asp Ile
690 695 700

<210> 10

<211> 1953

<212> DNA

<213> Pasteurella multocida

<400> 10

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120

aaatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcgatagt ccggttagata ttgcaacaca actgttactt
240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg
300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca
360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaacaaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa

SEQUENCE LISTING.ST25.txt

660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat
720

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780

gttgcaagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat
840

acacaacata ttgacccaaa agactttcta aataacgcga gtttgcttga atcattacca
900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

tttgcggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat
1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac
1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa
1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
1260

gtcccttata tctatagaaa actttttacca atagaagatt cgcatatcaa tagagtacct
1320

ttagtttcaa tttatatccc agcttataac tgtgcaaact atattcaacg ttgcgtagat
1380

agtgcactga atcagactgt tgttgatctc gaggtttgta tttgtaacga tgggtcaaca
1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggt acgcatcatg
1500

tctaaaccaa atggcggaat agcctcagca tcaaatgcag ccgtttcttt tgctaaagg
1560

tattacattg ggcagttaga ttcagatgat tatcttgagc ctgatgcagt tgaactgtgt

SEQUENCE LISTING.ST25.txt

1620

ttaaaagaat ttttaaaaga taaaacgcta gcttggtgttt ataccactaa tagaaacgtc
1680

aatccggatg gtagcttaat cgctaattgg tacaattggc cagaattttc acgagaaaaa
1740

ctcacaacgg ctatgattgc tcaccacttt agaattgtca cgattagagc ttggcattta
1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatggt cctcaaactc
1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt
1920

gataacacat caattaagaa acttggcatt caa
1953

<210> 11

<211> 2112

<212> DNA

<213> Pasteurella multocida

<400> 11

atgaatacat tatcacaagc aataaaagca tataacagca atgactatca attagcactc
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aaattatttg aaaagtcggc ggaaatctat ggacggaaaa ttgttgaatt tcaaattacc
120

aatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcgatagt ccggttagata ttgcaacaca actgttactt
240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg
300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca

SEQUENCE LISTING.ST25.txt

360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttgggtctt
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat
720

gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat
780

gttgcagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat
840

acacaacata ttgacccaaa agactttctta aataacgcga gtttgcttga atcattacca
900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

tttgcggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat
1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac
1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa
1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
1260

gtcccttata tctatagaaa actttttacca atagaagatt cgcatatcaa tagagtacct

SEQUENCE LISTING.ST25.txt

1320

ttagtttcaa tttatatccc agcttataac tgtgcaaact atattcaacg ttgcgtagat
1380

agtgcactga atcagactgt tgttgatctc gaggtttgta tttgtaacaa tggttcaaca
1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggt acgcatcatg
1500

tctaaaccaa atggcggaat agcctcagca tcaaatgcag ccgtttcttt tgctaaaggt
1560

tattacattg ggcagttaga ttcagatgat tatcttgagc ctgatgcagt tgaactgtgt
1620

ttaaaagaat ttttaaaaga taaaacgcta gcttgtgttt ataccactaa tagaaacgtc
1680

aatccggatg gtagcttaat cgctaattgg tacaattggc cagaattttc acgagaaaaa
1740

ctcacaacgg ctatgattgc tcaccacttt agaatgttca cgattagagc ttggcattta
1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatggt cctcaaactc
1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt
1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
2040

gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta
2100

aaagatatatt aa
2112

<210> 12

<211> 2112

SEQUENCE LISTING.ST25.txt

<212> DNA

<213> Pasteurella multocida

<400> 12

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aaattatttg aaaagtcggc ggaaatctat ggacggaaaa ttgttgaatt tcaaattacc
120

aaatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcatagat ccgtagata ttgcaacaca actgttactt
240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg
300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca
360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagataatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat
720

gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat
780

gttgacagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat

SEQUENCE LISTING.ST25.txt

840

acacaacata ttgacccaaa agacttctta aataacgcga gtttgcttga atcattacca
900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

tttgcggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat
1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac
1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa
1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
1260

gtcccttata tctatagaaa actttttacca atagaagatt cgcatatcaa tagagtacct
1320

ttagtttcaa tttatatccc agcttataac tgtgcaaact atattcaacg ttgcgtagat
1380

agtgcactga atcagactgt tgttgatctc gaggtttgta tttgtaacga tgggtcaaca
1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggt acgcatcatg
1500

tctaaaccaa atggcggaat agcctcagca tcaaatgcag ccgtttcttt tgctaaaggt
1560

tattacattg ggcagttaga ttcagatgat tatcttgagc ctgatgcagt tgaactgtgt
1620

ttaaaagaat ttttaaaaga taaaacgcta gcttgtgttt ataccactaa tagaaacgtc
1680

aatccggatg gtagcttaat cgctaattgg tacaattggc cagaattttc acgagaaaaa
1740

ctcacaacgg ctatgattgc tcaccacttt agaatgttca cgattagagc ttggcattta

SEQUENCE LISTING.ST25.txt

1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatggt cctcaaactc
1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt
1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
2040

gaaagtagaa agtatatattt caataaaacc gctgaatatac aagaagagat tgatatctta
2100

aaagatatatt aa
2112

<210> 13

<211> 1614

<212> DNA

<213> Pasteurella multocida

<400> 13

atcaatagag taccttttagt ttcaatttat atcccagctt ataactgtgc aaactatatt
60

caacgttgcg tagatagtgc actgaatcag actgttgttg atctcgaggt ttgtatttgt
120

aacgatgggt caacagataa taccttagaa gtgatcaata agctttatgg taataatcct
180

agggtacgca tcatgtctaa accaaatggc ggaatagcct cagcatcaaa tgcagccgtt
240

tcttttgcta aaggttatta cattgggcag ttagattcag atgattatct tgagcctgat
300

gcagttgaac tgtgttttaa agaattttta aaagataaaa cgctagcttg tgtttatacc

SEQUENCE LISTING.ST25.txt

360

actaatagaa acgtcaatcc ggatggtagc ttaatcgcta atgggtacaa ttggccagaa
420

ttttcacgag aaaaactcac aacggctatg attgctcacc actttagaat gttcacgatt
480

agagcttggc atttaactga tggattcaat gaaaaaattg aaaatgccgt agactatgac
540

atgttcctca aactcagtga agttggaaaa tttaaaccac ttaataaaat ctgctataac
600

cgtgtattac atggtgataa cacatcaatt aagaaacttg gcattcaaaa gaaaaacccat
660

tttgttgtag tcaatcagtc attaaataga caaggcataa cttattataa ttatgacgaa
720

tttgatgatt tagatgaaag tagaaagtat attttcaata aaaccgctga atatcaagaa
780

gagattgata tcttaaaaga tattaacatc atccagaata aagatgccaa aatcgcagtc
840

agtatttttt atcccaatac attaaacggc ttagtgaaaa aactaaacaa tattattgaa
900

tataataaaa atatattcgt tattgttcta catgttgata agaatcatct tacaccagat
960

atcaaaaaag aaatactagc cttctatcat aaacatcaag tgaatatttt actaaataat
1020

gatattctcat attacacgag taatagatta ataaaaactg aggcgcattt aagtaatatt
1080

aataaattaa gtcagttaaa tctaaattgt gaatacatca tttttgataa tcatgacagc
1140

ctattcggtta aaaatgacag ctatgcttat atgaaaaaat atgatgtcgg catgaatttc
1200

tcagcattaa cacatgattg gatcgagaaa atcaatgcgc atccaccatt taaaaagctc
1260

attaaaactt attttaatga caatgactta aaaagtatga atgtgaaagg ggcatcacaa

SEQUENCE LISTING.ST25.txt

1320

ggatatgttta tgacgtatgc gctagcgcat gagcttctga cgattattaa agaagtcac
1380

acatcttgcc agtcaattga tagtgtgcca gaatataaca ctgaggatat ttggttccaa
1440

tttgcacttt taatcttaga aaagaaaacc ggccatgtat ttaataaaac atcgaccctg
1500

acttatatgc cttgggaacg aaaattacaa tggacaaatg aacaaattga aagtgcacaaa
1560

agaggagaaa atatacctgt taacaagttc attattaata gtataactct ataa
1614

<210> 14

<211> 966

<212> DNA

<213> Pasteurella multocida

<400> 14

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caacgttgcg tagatagtgc actgaatcag actggttggtg atctcgagggt ttgtatttgt
120

aacgatgggt caacagataa taccttagaa gtgatcaata agctttatgg taataatcct
180

agggtacgca tcatgtctaa accaaatggc ggaatagcct cagcatcaaa tgcagccgtt
240

tcttttgcta aaggttatta cattgggcag ttagattcag atgattatct tgagcctgat
300

gcagttgaac tgtgttttaa agaattttta aaagataaaa cgctagcttg tgtttatacc
360

actaatagaa acgtcaatcc ggatggtagc ttaatcgcta atgggttacia ttggccagaa

SEQUENCE LISTING.ST25.txt

420

ttttcacgag aaaaactcac aacggctatg attgctcacc actttagaat gttcacgatt
480

agagcttggc atttaactga tggattcaat gaaaaaattg aaaatgccgt agactatgac
540

atgttctca aactcagtga agttggaaaa tttaaacatc ttaataaaat ctgctataac
600

cgtgtattac atggtgataa cacatcaatt aagaaacttg gcattcaaaa gaaaaaccat
660

tttgttgtag tcaatcagtc attaaataga caaggcataa cttattataa ttatgacgaa
720

tttgatgatt tagatgaaag tagaaagtat attttcaata aaaccgctga atatcaagaa
780

gagattgata tcttaaaaga tattaaaatc atccagaata aagatgccaa aatcgcagtc
840

agtatttttt atccaatac attaaacggc ttagtgaaaa aactaaacaa tattattgaa
900

tataataaaa atatattcgt tattgttcta catgttgata agaatcatct tacaccagat
960

atctaa
966

<210> 15

<211> 1821

<212> DNA

<213> Pasteurella multocida

<400> 15

atgaaacctg aacatcaaca tgttggtctt tctattatcg ttacaacatt caatcgacca
60

gcaattttat cgattacatt agcctgttta gtaaaccaaa aaacacatta cccgtttgaa

SEQUENCE LISTING.ST25.txt

120

gttatcgtga cagatgatgg tagtcaggaa gatctatcac cgatcattcg ccaatatgaa
180

aataaattgg atattcgcta cgtcagacaa aaagataacg gttttcaagc cagtgccgct
240

cggaatatgg gattacgctt agcaaaatat gactttattg gcttactcga ctgtgatatg
300

gcgccaaatc cattatgggt tcattcttat gttgcagagc tattagaaga tgatgattta
360

acaatcattg gtccaagaaa atacatcgat acacaacata ttgacccaaa agacttctta
420

aataacgcga gtttgcttga atcattacca gaagtgaaaa ccaataatag tgttgccgca
480

aaaggggaag gaacagtttc tctggattgg cgcttagaac aattcgaaaa aacagaaaat
540

ctccgcttat ccgattcgcc tttccgtttt tttgcggcgg gtaatgttgc tttcgctaaa
600

aaatggctaa ataaatccgg tttctttgat gaggaattta atcactgggg tggagaagat
660

gtggaatttg gatatcgctt attccgttac ggtagtttct ttaaaactat tgatggcatt
720

atggcctacc atcaagagcc accaggtaaa gaaaatgaaa ccgatcgtga agcgggaaaa
780

aatattacgc tcgatattat gagagaaaag gtcccttata tctatagaaa acttttacca
840

atagaagatt cgcatatcaa tagagtacct ttagtttcaa tttatatccc agcttataac
900

tgtgcaaact atattcaacg ttgcgtagat agtgcactga atcagactgt tgttgatctc
960

gaggtttgta tttgtaacga tggttcaaca gataatacct tagaagtgat caataagctt
1020

tatggtaata atcctagggt acgcatcatg tctaaaccaa atggcggaat agcctcagca

SEQUENCE LISTING.ST25.txt

1080

tcaaattgcag ccgtttcttt tgctaaaggt tattacattg ggcagttaga ttcagatgat
1140

tatcttgagc ctgatgcagt tgaactgtgt ttaaaagaat ttttaaaga taaaacgcta
1200

gcttgtgttt ataccactaa tagaaacgtc aatccggatg gtagcttaat cgctaattgg
1260

tacaattggc cagaattttc acgagaaaaa ctcacaacgg ctatgattgc tcaccacttt
1320

agaatgttca cgattagagc ttggcattta actgatggat tcaatgaaaa aattgaaaat
1380

gccgtagact atgacatggt cctcaaactc agtgaagttg gaaaatttaa acatcttaat
1440

aaaatctgct ataaccgtgt attacatggg gataacacat caattaagaa acttggcatt
1500

caaaagaaaa accattttgt tgtagtcaat cagtcattaa atagacaagg cataacttat
1560

tataattatg acgaatttga tgatttagat gaaagtagaa agtatatttt caataaaacc
1620

gctgaatatc aagaagagat tgatatctta aaagatatta aaatcatcca gaataaagat
1680

gccaaaatcg cagtcagtat tttttatccc aatacattaa acggcttagt gaaaaaacta
1740

aacaatatta ttgaatataa taaaaatata ttcgttattg ttctacatgt tgataagaat
1800

catcttacac cagatatcta a
1821

<210> 16

<211> 2112

<212> DNA

SEQUENCE LISTING.ST25.txt

<213> Pasteurella multocida

<400> 16

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60

aaattatttg aaaagtcggc ggaaatctat ggacggaaaa ttgttgaatt tcaaattacc
120

aaatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcatagc ccggttagata ttgcaacaca actgttactt
240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg
300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca
360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggctctt
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgaagg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat
720

gactttattg gcttactcga ctgtgatatg gcgccaatc cattatgggt tcattcttat
780

gttgcagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat
840

acacaacata ttgacccaaa agacttctta aataacgcga gtttgcttga atcattacca

SEQUENCE LISTING.ST25.txt

900

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960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

tttgccggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat
1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac
1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa
1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
1260

gtcccttata tctatagaaa acttttacca atagaagatt cgcatatcaa tagagtacct
1320

ttagtttcaa tttatatccc agcttataac tgtgcaaact atattcaacg ttgcgtagat
1380

agtgcaactga atcagactgt tgttgatctc gaggtttgta tttgtaacga tgggtcaaca
1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggt acgcatcatg
1500

tctaaaccaa atggcggaat agcctcagca tcaaatgcag ccgtttcttt tgctaaagg
1560

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1620

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1680

aatccggatg gtagcttaat cgctaattgg tacaattggc cagaattttc acgagaaaaa
1740

ctcacaacgg ctatgattgc tcaccacttt agaatgttca cgattagagc ttggcattta
1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatggt cctcaaactc

SEQUENCE LISTING.ST25.txt

1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggg
1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
2040

gaaagtagaa agtatatfff caataaaaacc gctgaatatc aagaagagat tgatatctta
2100

aaagatatff aa
2112

<210> 17

<211> 2112

<212> DNA

<213> Pasteurella multocida

<400> 17

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aaattatfff aaaagtcggc ggaaatctat ggacggaaaa ttgttgaatt tcaaattacc
120

aaatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcgatagt ccgttagata ttgcaacaca actgttactt
240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg
300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggctgc ccttgtacca
360

aaagatfffc ccaaagatct ggfffftagcg cctttacctg atcatgttaa tgatffftaca

SEQUENCE LISTING.ST25.txt

420

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480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagataaagg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat
720

gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat
780

gttgagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat
840

acacaacata ttgacccaaa agacttctta aataacgcga gtttgcttga atcattacca
900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

tttgcggcgg gtaatgttgc ttctgctaaa aaatggctaa ataaatccgg tttctttgat
1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac
1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa
1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
1260

gtcccttata tctatagaaa actttttacca atagaagatt cgcatatcaa tagagtacct
1320

ttagtttcaa tttatatccc agcttataac tgtgcaaact atattcaacg ttgcgtagat

SEQUENCE LISTING.ST25.txt

1380

agtgcactga atcagactgt tgttgatctc gaggtttgta tttgtaacga tgggtcaaca
1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggt acgcatcatg
1500

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1560

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1620

ttaaaagaat ttttaaaaga taaaacgcta gcttgtgttt ataccactaa tagaaacgct
1680

aatccggatg gtagcttaat cgctaattgg tacaattggc cagaattttc acgagaaaaa
1740

ctcacaacgg ctatgattgc tcaccacttt agaattgttc cgattagagc ttggcattta
1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatggt cctcaaactc
1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt
1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
2040

gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta
2100

aaagatatatt aa
2112

<210> 18

<211> 2112

<212> DNA

SEQUENCE LISTING.ST25.txt

<213> Pasteurella multocida

<400> 18

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120

aaatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaa
180

aaagaagaaa aagtcaatgt ttgcgatagt ccgtagata ttgcaacaca actgttactt
240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg
300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtagca
360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttgggtctt
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaacaaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat
720

gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat
780

gttgcagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat
840

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SEQUENCE LISTING.ST25.txt

900

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960

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1020

tttgcggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat
1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac
1140

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1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
1260

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1320

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1380

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1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggt acgcatcatg
1500

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1620

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1680

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1740

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1800

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SEQUENCE LISTING.ST25.txt

1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt
1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
2040

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2100

aaagatatTT aa
2112

<210> 19

<211> 2112

<212> DNA

<213> Pasteurella multocida

<400> 19

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aaattatttg aaaagtcggc ggaaatctat ggacggaaaa ttgttgaatt tcaaattacc
120

aaatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcgatagt ccgttagata ttgcaacaca actgttactt
240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg
300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca
360

aaagatTTTt ccaaagatct ggTTTTtagcg cTTTtacctg atcatgttaa tgattTTTaca

SEQUENCE LISTING.ST25.txt

420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt
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540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat
720

gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat
780

gttgagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat
840

acacaacata ttgacccaaa agactttcta aataacgcga gtttgcttga atcattacca
900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

tttgcggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat
1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac
1140

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1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
1260

gtcccttata tctatagaaa actttttacca atagaagatt cgcatatcaa tagagtacct
1320

ttagtttcaa tttatatccc agcttataac tgtgcaaact atattcaacg ttgcgtagat

SEQUENCE LISTING.ST25.txt

1380

agtgactga atcagactgt tgttgatctc gaggtttgta tttgtaacaa aggttcaaca
1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggt acgcatcatg
1500

tctaaaccaa atggcggaat agcctcagca tcaaatgcag ccgtttcttt tgctaaaggt
1560

tattacattg ggcagttaga ttcagatgat tatcttgagc ctgatgcagt tgaactgtgt
1620

ttaaaagaat ttttaaaaga taaaacgcta gcttgtgttt ataccactaa tagaaacgtc
1680

aatccggatg gtagcttaat cgctaattgg tacaattggc cagaattttc acgagaaaaa
1740

ctcacaacgg ctatgattgc tcaccacttt agaattgttca cgattagagc ttggcattta
1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatggt cctcaaactc
1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt
1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
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aaagatatatt aa
2112

<210> 20

<211> 2271

<212> DNA

SEQUENCE LISTING.ST25.txt

<213> Pasteurella multocida

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120

aaatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcgatagt ccgtagata ttgcaacaca actgttactt
240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg
300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca
360

aaagattttc ccaaagatct ggttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttgggtctt
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat
720

gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat
780

gttgcagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat
840

acacaacata ttgacccaaa agacttctta aataacgcga gtttgcttga atcattacca

SEQUENCE LISTING.ST25.txt

900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

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1020

tttgcggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat
1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac
1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa
1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
1260

gtcccttata tctatagaaa acttttacca atagaagatt cgcatatcaa tagagtacct
1320

ttagtttcaa tttatatccc agcttataac tgtgcaaact atattcaacg ttgcgtagat
1380

agtgcaactga atcagactgt tgttgatctc gaggtttgta tttgtaacga tggttcaaca
1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggt acgcatcatg
1500

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1560

tattacattg ggcagttaga ttcagatgat tatcttgagc ctgatgcagt tgaactgtgt
1620

ttaaaagaat ttttaaaaga taaaacgcta gcttgtgttt ataccactaa tagaaacgtc
1680

aatccggatg gtagcttaat cgctaattgg tacaattggc cagaattttc acgagaaaaa
1740

ctcacaacgg ctatgattgc tcaccacttt agaatgttca cgattagagc ttggcattta
1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatggt cctcaaactc

SEQUENCE LISTING.ST25.txt

1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt
1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
2040

gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta
2100

aaagatatta aaatcatcca gaataaagat gccaaaatcg cagtcagtat tttttatccc
2160

aatacattaa acggcttagt gaaaaaacta aacaatatta ttgaatataa taaaaatata
2220

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2271

<210> 21

<211> 1704

<212> DNA

<213> Pasteurella multocida

<400> 21

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120

aatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcgatagt ccggttagata ttgcaacaca actgttactt
240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg

SEQUENCE LISTING.ST25.txt

300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca
360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtaaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggctctt
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat
720

gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat
780

gttgcagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat
840

acacaacata ttgacccaaa agactttcta aataacgcga gtttgcttga atcattacca
900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

tttgcggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat
1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac
1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa
1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag

SEQUENCE LISTING.ST25.txt

1260

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1380

agtgcactga atcagactgt tgttgatctc gaggtttgta tttgtaacga tggttcaaca
1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggt acgcatcatg
1500

tctaaaccaa atggcggaat agcctcagca tcaaatgcag ccgtttcttt tgctaaaggt
1560

tattacattg ggcagttaga ttcagatgat tatcttgagc ctgatgcagt tgaactgtgt
1620

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1680

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1704

<210> 22

<211> 18

<212> PRT

<213> artificial sequence

<220>

<223> synthetic peptide based on residues 526-543 of pmHAS

<400> 22

Leu	Asp	Ser	Asp	Asp	Tyr	Leu	Glu	Pro	Asp	Ala	Val	Glu	Leu	Cys	Leu
1				5					10					15	

Lys Glu

SEQUENCE LISTING.ST25.txt

<210> 23

<211> 24

<212> DNA

<213> Artificial sequence

<220>

<223> primer Pm10

<400> 23

cactgtctaa ctttattggt agcc

24

<210> 24

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> primer Pm21

<400> 24

tttttaacga ataggctgtc

20

<210> 25

<211> 19

<212> PRT

<213> artificial sequence

SEQUENCE LISTING.ST25.txt

<220>

<223> synthetic peptide based on residues 526 to 544 of pmHAS protein

<400> 25

Leu Asp Ser Asp Asp Tyr Leu Glu Pro Asp Ala Val Glu Leu Cys Leu
1 5 10 15

Lys Glu Phe

<210> 26

<211> 2115

<212> DNA

<213> Pasteurella multocida

<400> 26

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120

aaatgtaaag aaaaactctc gaccaattct tatgtaagtg aagataaaaa aaacagtgtt
180

tgcgatagct cattagatat cgcaacacag ctcttacttt ccaacgtaaa aaaattaact
240

ctatccgaat cagaaaaaaaa cagtttataaa aataaatgga aatctatcac tgggaaaaaa
300

tcggagaacg cagaaatcag aaaggtggaa ctagtaccba aagattttcc taaagatctt
360

gttcttgctc cattgccaga tcatgttaat gattttacat ggtacaaaaa tcgaaaaaaa

SEQUENCE LISTING.ST25.txt

420

agcttaggta taaagcctgt aaataagaat atcgggtcttt ctattattat tcctacattt
480

aatcgtagcc gtattttaga tataacgtta gcctgttttg tcaatcagaa aacaaactac
540

ccatttgaag tcgttggtgc agatgatggg agtaaggaaa acttacttac cattgtgcaa
600

aaatacgaac aaaaacttga cataaagtat gtaagacaaa aagattatgg atatcaattg
660

tgtgcagtca gaaacttagg tttacgtaca gcaaagtatg attttgtctc gattctagac
720

tgcgatatgg caccacaaca attatggggt cattcttatt ttacagaact attagaagac
780

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840

caattcctta acgatccata tttaatagaa tcactacctg aaaccgctac aaataacaat
900

ccttcgatta catcaaaagg aaatatatcg ttggattgga gattagaaca tttcaaaaaa
960

accgataatc tacgtctatg tgattctccg tttcggttatt ttagttgogg taatgttgca
1020

ttttctaaag aatggctaaa taaagtaggt tggttcgatg aagaatttaa tcattggggg
1080

ggcgaagatg tagaatttgg ttacagatta ttgccaaag gctgtttttt cagagtaatt
1140

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1200

gctggtaaaa gtattacgct taaaattgtg aaagaaaagg taccttacat ctatagaaag
1260

cttttaccaa tagaagattc acatattcat agaatacctt tagtttctat ttatatcccc
1320

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SEQUENCE LISTING.ST25.txt

1380

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1500

gcctcagcat caaatgcagc cgtttctttt gctaaagggtt attacattgg gcagtttagat
1560

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1620

aaaacgctag cttgtgttta taccactaat agaaacgtca atccggatgg tagcttaatc
1680

gctaattggtt acaattggcc agaattttca cgagaaaaac tcacaacggc tatgattgct
1740

caccatttta gaatgtttac gattagagct tggcatttaa cggatggatt taacgaaaat
1800

attgaaaacg ccgtggatta tgacatgttc cttaaactca gtgaagttgg aaaatttaaa
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1920

ctcggcattc aaaagaaaaa ccattttgtt gtagtcaatc agtcattaaa tagacaaggc
1980

atcaattatt ataattatga caaatttgat gatttagatg aaagtagaaa gtatatcttc
2040

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2100

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2115

<210> 27

<211> 1980

<212> DNA

SEQUENCE LISTING.ST25.txt

<213> Pasteurella multocida

<400> 27

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120

aaattagtagt tttctgactc ggaaaaaaac acgttaaaaa ataaatggaa attgctcact
180

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240

aaagatctgg ttttagcgcc ttacctgat catgttaatg attttacatg gtacaaaaag
300

cgaaagaaaa gacttggcat aaaacctgaa catcaacatg ttggtctttc tattatcggt
360

acaacattca atcgaccagc aattttatcg attacattag cctgttttagt aaaccaaaaa
420

acacattacc cgtttgaagt tatcgtgaca gatgatggta gtcaggaaga tctatcacccg
480

atcattcgcc aatatgaaaa taaattggat attcgctacg tcagacaaaa agataacggt
540

tttcaagcca gtgccgctcg gaatatggga ttacgcttag caaaatatga ctttattggc
600

ttactcgact gtgatatggc gccaaatcca ttatgggttc attccttatgt tgcagagcta
660

ttagaagatg atgatttaac aatcattggt ccaagaaaat acatcgatac acaacatatt
720

gacccaaaag acttcttaaa taacgcgagt ttgcttgaat cattaccaga agtgaaaacc
780

aataatagtg ttgccgcaaa aggggaagga acagtttctc tggattggcg cttagaacia
840

ttcgaaaaaa cagaaaatct ccgcttatcc gattcgccctt tccgtttttt tgcggcgggg

SEQUENCE LISTING.ST25.txt

900

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960

cactggggtg gagaagatgt ggaatttgga tatcgcttat tccgttacgg tagtttcttt
1020

aaaactattg atggcattat ggcctaccat caagagccac caggtaaaga aaatgaaacc
1080

gatcgtgaag cgggaaaaaa tattacgctc gatattatga gagaaaaggt cccttatatc
1140

tatagaaaac ttttaccaat agaagattcg catatcaata gagtaccttt agtttcaatt
1200

tatatcccag cttataactg tgcaaactat attcaacggt gcgtagatag tgcactgaat
1260

cagactgttg ttgatctcga ggtttgtatt tgtaacgatg gttcaacaga taatacctta
1320

gaagtgatca ataagcttta tggttaataat cctagggtag gcatcatgtc taaaccaa
1380

ggcggaatag cctcagcatc aaatgcagcc gtttcttttg ctaaagggtta ttacattggg
1440

cagttagatt cagatgatta tcttgagcct gatgcagttg aactgtgttt aaaagaattt
1500

ttaaaagata aaacgctagc ttgtgtttat accactaata gaaacgtcaa tccggatggg
1560

agcttaatcg ctaatgggta caattggcca gaattttcac gagaaaaact cacaacggct
1620

atgattgctc accacttttag aatgttcacg attagagctt ggcatttaac tgatggattc
1680

aatgaaaaaa ttgaaaatgc cgtagactat gacatgttcc tcaaactcag tgaagttgga
1740

aaatttaaac atcttaataa aatctgctat aaccgtgtat tacatgggtga taacacatca
1800

attaagaaac ttggcattca aaagaaaaac cattttggtg tagtcaatca gtcattaaat

SEQUENCE LISTING.ST25.txt

1860

agacaaggca taacttatta taattatgac gaatttgatg atttagatga aagtagaaag
1920

tatattttca ataaaaccgc tgaatatcaa gaagagattg atatcttaaa agatatttaa
1980

<210> 28

<211> 1902

<212> DNA

<213> Pasteurella multocida

<400> 28

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120

gcggaggtaa gagcggtcgc ccttgtagca aaagattttc ccaaagatct gggttttagcg
180

cctttacctg atcatgttaa tgattttaca tggtagaaaa agcgaaagaa aagacttggc
240

ataaaacctg aacatcaaca tggttggtctt tctattatcg ttacaacatt caatcgacca
300

gcaattttat cgattacatt agcctgttta gtaaaccaaa aaacacatta cccgtttgaa
360

gttatcgtga cagatgatgg tagtcaggaa gatctatcac cgatcattcg ccaatatgaa
420

aataaattgg atattcgcta cgtcagacaa aaagataacg gttttcaagc cagtgccgct
480

cggaatatgg gattacgctt agcaaaatat gactttattg gcttactcga ctgtgatatg
540

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SEQUENCE LISTING.ST25.txt

600

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660

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720

aaaggggaag gaacagtttc tctggattgg cgcttagaac aattcgaaaa aacagaaaat
780

ctccgcttat ccgattcgcc tttccgtttt tttgcggcgg gtaatgttgc tttcgctaaa
840

aaatggctaa ataaatccgg tttctttgat gaggaattta atcactgggg tggagaagat
900

gtggaatttg gatatcgctt attccgttac ggtagtttct ttaaaactat tgatggcatt
960

atggcctacc atcaagagcc accaggtaaa gaaaatgaaa ccgatcgtga agcgggaaaa
1020

aatattacgc tcgatattat gagagaaaag gtcccttata tctatagaaa acttttacca
1080

atagaagatt cgcatatcaa tagagtacct ttagtttcaa tttatatccc agcttataac
1140

tgtgcaaact atattcaacg ttgcgtagat agtgcactga atcagactgt tgttgatctc
1200

gaggtttgta tttgtaacga tggttcaaca gataatacct tagaagtgat caataagctt
1260

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1320

tcaaatgcag ccgtttcttt tgctaaagggt tattacattg ggcagttaga ttcagatgat
1380

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1440

gcttggtgtt ataccactaa tagaaacgtc aatccggatg gtagcttaat cgctaattgg
1500

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SEQUENCE LISTING.ST25.txt

1560

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1620

gccgtagact atgacatggt cctcaaactc agtgaagttg gaaaatttaa acatcttaat
1680

aaaatctgct ataaccgtgt attacatggt gataacacat caattaagaa acttggcatt
1740

caaaagaaaa accatthttgt tgtagtcaat cagtcattaa atagacaagg cataacttat
1800

tataattatg acgaatttga tgatttagat gaaagtagaa agtatatttt caataaaacc
1860

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1902

<210> 29

<211> 1830

<212> DNA

<213> Pasteurella multocida

<400> 29

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120

catgttaatg atthttacatg gtacaaaaag cgaaagaaaa gacttggcat aaaacctgaa
180

catcaacatg ttggtctthc tattatcgtht acaacattca atcgaccagc aatthttatcg
240

attacattag cctgtthtagt aaaccaaaaa acacattacc cgthttgaagt tatcgthgaca
300

gatgatggta gtcaggaaga tctatcaccg atcattcgcc aatatgaaaa taaattggat

SEQUENCE LISTING.ST25.txt

360

attcgctacg tcagacaaaa agataacggt tttcaagcca gtgccgctcg gaatatggga
420

ttacgcttag caaaatatga ctttattggc ttactcgact gtgatatggc gccaaatcca
480

ttatgggttc attcttatgt tgcagagcta ttagaagatg atgatttaac aatcattggt
540

ccaagaaaat acatcgatac acaacatatt gacccaaaag acttcttaaa taacgcgagt
600

ttgcttgaat cattaccaga agtgaaaacc aataatagtg ttgccgcaaa aggggaagga
660

acagtttctc tggattggcg cttagaacaa ttcgaaaaaa cagaaaatct ccgcttatcc
720

gattcgctt tccgtttttt tgcggcgggt aatgttgctt tcgctaaaaa atggctaaat
780

aaatccggtt tctttgatga ggaatttaat cactgggggtg gagaagatgt ggaatttgga
840

tatcgcttat tccgttacgg tagtttcttt aaaactattg atggcattat ggcctaccat
900

caagagccac caggtaaaga aaatgaaacc gatcgtgaag cgggaaaaaa tattacgctc
960

gatattatga gagaaaaggt cccttatatc tatagaaaac ttttaccaat agaagattcg
1020

catatcaata gagtaccttt agtttcaatt tatatcccag cttataactg tgcaaactat
1080

attcaacggt gcgtagatag tgcactgaat cagactgttg ttgatctoga ggtttgtatt
1140

tgtaacgatg gttcaacaga taatacctta gaagtgatca ataagcttta tggtataaat
1200

cctagggtag gcatcatgtc taaaccaa atggcgaatag cctcagcatc aaatgcagcc
1260

gtttcttttg ctaaagggtta ttacattggg cagtttagatt cagatgatta tcttgagcct

SEQUENCE LISTING.ST25.txt

1320

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1380

accactaata gaaacgtcaa tccggatggt agcttaatcg ctaatgggta caattggcca
1440

gaattttcac gagaaaaact cacaacggct atgattgctc accactttag aatgttcacg
1500

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1560

gacatgttcc tcaaactcag tgaagttgga aaatttaaac atcttaataa aatctgctat
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aaccgtgtat tacatgggtga taacacatca attaagaaac ttggcattca aaagaaaaac
1680

cattttgttg tagtcaatca gtcattaaat agacaaggca taacttatta taattatgac
1740

gaatttgatg atttagatga aagtagaaag tatattttca ataaaaccgc tgaatatcaa
1800

gaagagattg atatcttaaa agatatttaa
1830

<210> 30

<211> 1764

<212> DNA

<213> Pasteurella multocida

<400> 30

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60

aatgatttta catggtacaa aaagcgaaag aaaagacttg gcataaaacc tgaacatcaa
120

catgttggtc tttctattat cgttacaaca ttcaatcgac cagcaatttt atcgattaca

SEQUENCE LISTING.ST25.txt

180

ttagcctggt tagtaaacca aaaaacacat taccggttg aagttatcgt gacagatgat
240

ggtagtcagg aagatctatc accgatcatt cgccaatatg aaaataaatt ggatattcgc
300

tacgtcagac aaaaagataa cggttttcaa gccagtgccg ctcggaatat gggattacgc
360

ttagcaaaat atgactttat tggcttactc gactgtgata tggcgccaaa tccattatgg
420

gttcattctt atgttgcaga gctattagaa gatgatgatt taacaatcat tggccaaga
480

aaatacatcg atacacaaca tattgacca aaagacttct taaataacgc gagtttgctt
540

gaatcattac cagaagtga aaccaataat agtggtgccg caaaagggga aggaacagtt
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tctctggatt ggcgcttaga acaattcgaa aaaacagaaa atctccgctt atccgattcg
660

cctttccggt tttttgcggc gggtaatgtt gctttcgcta aaaaatggct aaataaatcc
720

ggtttctttg atgaggaatt taatcactgg ggtggagaag atgtggaatt tggatatcgc
780

ttattccggt acggtagttt ctttaaaact attgatggca ttatggccta ccatcaagag
840

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900

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960

aatagagtac ctttagtttc aatttatatc ccagcttata actgtgcaaa ctatattcaa
1020

cgttgcgtag atagtgcact gaatcagact gttgttgatc tcgaggtttg tatttgtaac
1080

gatggttcaa cagataatac cttagaagtg atcaataagc tttatggtaa taatcctagg

SEQUENCE LISTING.ST25.txt

1140

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1200

tttgctaaag gttattacat tgggcagtta gattcagatg attatcttga gcctgatgca
1260

gttgaactgt gtttaaaaga atttttaaaa gataaaacgc tagcttgtgt ttataccact
1320

aatagaaacg tcaatccgga tggtagctta atcgctaag gttacaattg gccagaattt
1380

tcacgagaaa aactcacaac ggctatgatt gctcaccact ttagaatggt cacgattaga
1440

gcttggcatt taactgatgg attcaatgaa aaaattgaaa atgccgtaga ctatgacatg
1500

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gtattacatg gtgataaacac atcaattaag aaacttggca ttcaaaagaa aaaccatttt
1620

gttgtagtca atcagtcatt aaatagacaa ggcataactt attataatta tgacgaattt
1680

gatgatttag atgaaagtag aaagtatatt ttcaataaaa ccgctgaata tcaagaagag
1740

attgatattt taaaagatat ttaa
1764

<210> 31

<211> 2007

<212> DNA

<213> Pasteurella multocida

<400> 31

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SEQUENCE LISTING.ST25.txt

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aaatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcgatagt ccgttagata ttgcaacaca actgttactt
240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg
300

aaattgctca ctgagaagaa atctgaaaat gcgagggtaa gagcggtcgc ccttgtacca
360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggctct
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat
720

gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat
780

gttgcagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat
840

acacaacata ttgacccaaa agacttctta aataacgcga gtttgcttga atcattacca
900

gaagtgaaaa ccaataatag tgttgccgca aaagggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt

SEQUENCE LISTING.ST25.txt

1020

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1080

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1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa
1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
1260

gtcccttata tctatagaaa acttttacca atagaagatt cgcatatcaa tagagtacct
1320

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1380

agtgcactga atcagactgt tgttgatctc gaggtttgta tttgtaacga tggttcaaca
1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggg acgcatcatg
1500

tctaaaccaa atggcggaat agcctcagca tcaaatgcag ccgtttcttt tgctaaagg
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1680

aatccggatg gtagcttaat cgctaattgg tacaattggc cagaattttc acgagaaaaa
1740

ctcacaacgg ctatgattgc tcaccacttt agaatgttca cgattagagc ttggcattta
1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatggt cctcaaactc
1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt
1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat

SEQUENCE LISTING.ST25.txt

1980

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2007

<210> 32

<211> 2061

<212> DNA

<213> Pasteurella multocida

<400> 32

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120

aaatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcgatagt ccgtagata ttgcaacaca actgttactt
240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg
300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca
360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaacaaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa

SEQUENCE LISTING.ST25.txt

660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat
720

gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat
780

gttgacagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat
840

acacaacata ttgacccaaa agacttctta aataacgcga gtttgcttga atcattacca
900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

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1080

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1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
1260

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1320

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1380

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1440

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1500

tctaaaccaa atggcggaat agcctcagca tcaaagcag ccgtttcttt tgctaaagg
1560

tattacattg ggcagttaga ttcagatgat tatcttgagc ctgatgcagt tgaactgtgt

SEQUENCE LISTING.ST25.txt

1620

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1680

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1740

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1800

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1860

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1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
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gaaagtagaa agtatattta a
2061

<210> 33

<211> 2112

<212> DNA

<213> Pasteurella multocida

<400> 33

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120

aatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcgatagt ccgtagata ttgcaacaca actgttactt

SEQUENCE LISTING.ST25.txt

240

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300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca
360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt
480

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540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat
720

gactttattg gcttactcga atgtgatatg gcgccaaatc cattatgggt tcattcttat
780

gttgacagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat
840

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900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

tttgcggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat
1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac
1140

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SEQUENCE LISTING.ST25.txt

1200

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1260

gtcccttata tctatagaaa actttttacca atagaagatt cgcatatcaa tagagtacct
1320

ttagtttcaa tttatatccc agcttataac tgtgcaaact atattcaacg ttgcgtagat
1380

agtgcaactga atcagactgt tgttgatctc gaggtttgta tttgtaacga tggttcaaca
1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggt acgcatcatg
1500

tctaaaccaa atggcggaat agcctcagca tcaaatgcag ccgtttcttt tgctaaagg
1560

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1620

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1680

aatccggatg gtagcttaat cgctaattgg tacaattggc cagaattttc acgagaaaaa
1740

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1800

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1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt
1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
2040

gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta
2100

aaagatatatt aa

SEQUENCE LISTING.ST25.txt

2112

<210> 34

<211> 2112

<212> DNA

<213> Pasteurella multocida

<400> 34

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120

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180

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240

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300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca
360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggctct
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

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600

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SEQUENCE LISTING.ST25.txt

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840

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900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

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1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac
1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa
1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
1260

gtcccttata tctatagaaa actttttacca atagaagatt cgcatatcaa tagagtacct
1320

ttagtttcaa tttatatccc agcttataac tgtgcaaact atattcaacg ttgcgtagat
1380

agtgcactga atcagactgt tgttgatctc gaggtttgta tttgtaacga tggttcaaca
1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggg acgcatcatg
1500

tctaaaccaa atggcggaat agcctcagca tcaaagtcag ccgtttcttt tgctaaagggt
1560

tattacattg ggcagttaga ttcagatgat tatcttgagc ctgatgcagt tgaactgtgt
1620

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SEQUENCE LISTING.ST25.txt

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1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatggt cctcaaactc
1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt
1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
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aaagatatatt aa
2112

<210> 35

<211> 2112

<212> DNA

<213> Pasteurella multocida

<400> 35

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120

aatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

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SEQUENCE LISTING.ST25.txt

240

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360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt
480

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540

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600

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660

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720

gactttattg gcttactcaa atgtgatatg gcgccaaatc cattatgggt tcattcttat
780

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840

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900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

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1020

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1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac
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SEQUENCE LISTING.ST25.txt

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1320

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1500

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1800

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1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt
1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
2040

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aaagatatatt aa

SEQUENCE LISTING.ST25.txt

2112

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<211> 2112

<212> DNA

<213> Pasteurella multocida

<400> 36

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120

aatgcaaag aaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa agtcaatgt ttgcgatagt ccggttagata ttgcaacaca actgttactt
240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg
300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca
360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat

SEQUENCE LISTING.ST25.txt

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960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
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1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac
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ggtagtttct ttaaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa
1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
1260

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1500

tctaaaccaa atggcggaat agcctcagca tcaaatgcag ccgtttcttt tgctaaagggt
1560

tattacattg ggcagttaga ttcagatgat tatcttgagc ctgatgcagt tgaactgtgt
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SEQUENCE LISTING.ST25.txt

1680

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1800

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1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt
1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
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gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta
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aaagatatTT aa
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<212> DNA

<213> Pasteurella multocida

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aaattatttg aaaagtcggc ggaaatctat ggacggaaaa ttgttgaatt tcaaattacc
120

aatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcgatagt ccgtagata ttgcaacaca actgttactt

SEQUENCE LISTING.ST25.txt

240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg
300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca
360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat
720

gactttattg gcttactcga ctgtaatatg gcgccaaatc cattatgggt tcattcttat
780

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840

acacaacata ttgacccaaa agactttcta aataacgcga gtttgcttga atcattacca
900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

tttgcggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat
1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac
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SEQUENCE LISTING.ST25.txt

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1500

tctaaaccaa atggcggaat agcctcagca tcaaatgcag ccgtttcttt tgctaaagg
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tattacattg ggcagttaga ttcagatgat tatcttgagc ctgatgcagt tgaactgtgt
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1800

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1860

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1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
2040

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2100

aaagatatatt aa

SEQUENCE LISTING.ST25.txt

2112

<210> 38

<211> 2112

<212> DNA

<213> Pasteurella multocida

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120

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180

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300

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360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaacccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat

SEQUENCE LISTING.ST25.txt

720

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780

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840

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960

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1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
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1500

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tattacattg ggcagttaga ttcagatgat tatcttgagc ctgatgcagt tgaactgtgt
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SEQUENCE LISTING.ST25.txt

1680

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1800

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1860

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1920

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1980

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aaagatatatt aa
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<210> 39

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<212> DNA

<213> Pasteurella multocida

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120

aatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcgatagt ccgtagata ttgcaacaca actgttactt

SEQUENCE LISTING.ST25.txt

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480

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780

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840

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900

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960

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1080

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SEQUENCE LISTING.ST25.txt

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1920

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1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
2040

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aaagatatatt aa

SEQUENCE LISTING.ST25.txt

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<211> 2112

<212> DNA

<213> Pasteurella multocida

<400> 40

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60

aaattatattg aaaagtcggc ggaaatctat ggacggaaaa ttgttgaatt tcaaattacc
120

aatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcgatagt ccggttagata ttgcaacaca actgttactt
240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg
300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca
360

aaagattttc ccaaagatct ggttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggctctt
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat

SEQUENCE LISTING.ST25.txt

720

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780

gttgagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat
840

acacaacata ttgacccaaa agacttctta aataacgcga gtttgcttga atcattacca
900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

tttgccggcg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat
1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac
1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa
1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
1260

gtcccttata tctatagaaa actttttacca atagaagatt cgcatatcaa tagagtacct
1320

ttagtttcaa tttatatccc agcttataac tgtgcaaact atattcaacg ttgcgtagat
1380

agtgcactga atcagactgt tgttgatctc gaggtttgta tttgtaacga tggttcaaca
1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggt acgcatcatg
1500

tctaaaccaa atggcggaat agcctcagca tcaaagcag ccgtttcttt tgctaaaggt
1560

tattacattg ggcagttaga atcagatgat tatcttgagc ctgatgcagt tgaactgtgt
1620

ttaaaagaat ttttaaaaga taaaacgcta gcttgtgttt ataccactaa tagaaacgtc

SEQUENCE LISTING.ST25.txt

1680

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1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatggt cctcaaactc
1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt
1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
2040

gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta
2100

aaagatatatt aa
2112

<210> 41

<211> 2112

<212> DNA

<213> Pasteurella multocida

<400> 41

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aaattatttg aaaagtcggc ggaaatctat ggacggaaaa ttgttgaatt tcaaattacc
120

aatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcgatagt ccgttagata ttgcaacaca actgttactt

SEQUENCE LISTING.ST25.txt

240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg
300

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360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat
720

gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat
780

gttgacagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat
840

acacaacata ttgaccctaaa agacttctta aataacgcga gtttgcttga atcattacca
900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

tttgcggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat
1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac
1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa

SEQUENCE LISTING.ST25.txt

1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
1260

gtcccttata tctatagaaa actttttacca atagaagatt cgcatatcaa tagagtacct
1320

ttagttttcaa tttatatccc agcttataac tgtgcaaact atattcaacg ttgcgtagat
1380

agtgcactga atcagactgt tgttgatctc gaggtttgta tttgtaacga tggttcaaca
1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggt acgcatcatg
1500

tctaaaccaa atggcggaat agcctcagca tcaaatgcag ccgtttcttt tgctaaaggt
1560

tattacattg ggcagttaaa atcagatgat tatcttgagc ctgatgcagt tgaactgtgt
1620

ttaaaagaat ttttaaaaga taaaacgcta gcttggtgtt ataccactaa tagaaacgtc
1680

aatccggatg gtagcttaat cgctaattgg tacaattggc cagaattttc acgagaaaaa
1740

ctcacaacgg ctatgattgc tcaccacttt agaatgttca cgattagagc ttggcattta
1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatggt cctcaaactc
1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt
1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
2040

gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta
2100

aaagatatatt aa

SEQUENCE LISTING.ST25.txt

2112

<210> 42

<211> 2112

<212> DNA

<213> Pasteurella multocida

<400> 42

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aaattatttg aaaagtcggc ggaaatctat ggacggaaaa ttgttgaatt tcaaattacc
120

aaatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcgatagt ccggttagata ttgcaacaca actgttactt
240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacggttaa aaataaatgg
300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca
360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat

SEQUENCE LISTING.ST25.txt

720

gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat
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gttgagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat
840

acacaacata ttgacccaaa agacttctta aataacgcga gtttgcttga atcattacca
900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

tttgccggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat
1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac
1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa
1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
1260

gtcccttata tctatagaaa acttttacca atagaagatt cgcatatcaa tagagtacct
1320

ttagtttcaa tttatatccc agcttataac tgtgcaaact atattcaacg ttgcgtagat
1380

agtgcactga atcagactgt tgttgatctc gaggtttgta tttgtaacga tggttcaaca
1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggt acgcatcatg
1500

tctaaaccaa atggcggaat agcctcagca tcaaagcag ccgtttcttt tgctaaaggt
1560

tattacattg ggcagttaga ttcagaagat tatcttgagc ctgatgcagt tgaactgtgt
1620

ttaaaagaat ttttaaaaga taaaacgcta gcttgtgttt ataccactaa tagaaacgtc

SEQUENCE LISTING.ST25.txt

1680

aatccggatg gtagcttaat cgctaattggt tacaattggc cagaattttc acgagaaaaa
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1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatggt cctcaaactc
1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt
1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
2040

gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta
2100

aaagatatatt aa
2112

<210> 43

<211> 2112

<212> DNA

<213> Pasteurella multocida

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aaattatttg aaaagtcggc ggaaatctat ggacggaaaa ttgttgaatt tcaaattacc
120

aatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcgatagt ccgtagata ttgcaacaca actgttactt

SEQUENCE LISTING.ST25.txt

240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg
300

aaattgctca ctgagaagaa atctgaaaat gcggaggttaa gagcggtcgc ccttgtacca
360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat
720

gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat
780

gttgcagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat
840

acacaacata ttgacccaaa agactttcta aataacgcga gtttgcttga atcattacca
900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

tttgcggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat
1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac
1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa

SEQUENCE LISTING.ST25.txt

1200

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1320

ttagttttcaa tttatatccc agcttataac tgtgcaaact atattcaacg ttgcgtagat
1380

agtgcactga atcagactgt tggtgatctc gaggtttgta tttgtaacga tgggttcaaca
1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggt acgcatcatg
1500

tctaaaccaa atggcggaat agcctcagca tcaaattgcag ccgtttcttt tgctaaagggt
1560

tattacattg ggcagttaga ttcaaattgat tatcttgagc ctgatgcagt tgaactgtgt
1620

ttaaaagaat ttttaaaaga taaaacgcta gcttgtgttt ataccactaa tagaaacgtc
1680

aatccggatg gtagcttaat cgctaattggg tacaattggc cagaattttc acgagaaaaa
1740

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1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatggt cctcaaactc
1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggg
1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
2040

gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta
2100

aaagatatatt aa

SEQUENCE LISTING.ST25.txt

2112

<210> 44

<211> 2112

<212> DNA

<213> Pasteurella multocida

<400> 44

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aaattatttg aaaagtcggc ggaaatctat ggacggaaaa ttgttgaatt tcaaattacc
120

aatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcgatagt ccgttagata ttgcaacaca actgttactt
240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg
300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca
360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggctctt
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaacccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat

SEQUENCE LISTING.ST25.txt

720

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780

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840

acacaacata ttgacccaaa agacttctta aataacgcga gtttgcttga atcattacca
900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

tttgcggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat.
1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac
1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa
1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
1260

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1320

ttagtttcaa tttatatccc agcttataac tgtgcaaact atattcaacg ttgcgtagat
1380

agtgcactga atcagactgt tgttgatctc gaggtttgta tttgtaacga tggttcaaca
1440

gataatacct tagaagtgat caataagctt tatggtaata atcctaggggt acgcatcatg
1500

tctaaaccaa atggcggaat agcctcagca tcaaagtcag ccgtttcttt tgctaaagggt
1560

tattacattg ggcagttaga ttcaaaagat tatcttgagc ctgatgcagt tgaactgtgt
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SEQUENCE LISTING.ST25.txt

1680

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1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatggt cctcaaactc
1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt
1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
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gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta
2100

aaagatatatt aa
2112

<210> 45

<211> 2112

<212> DNA

<213> Pasteurella multocida

<400> 45

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aaattatttg aaaagtcggc ggaaatctat ggacggaaaa ttgttgaatt tcaaattacc
120

aatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcatagat ccgttagata ttgcaacaca actgttactt

SEQUENCE LISTING.ST25.txt

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aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca
360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat
720

gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat
780

gttgcagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat
840

acacaacata ttgacccaaa agactttcta aataacgcga gtttgcttga atcattacca
900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

tttgcggcgg gtaatgttgc ttccgctaaa aaatggctaa ataaatccgg tttctttgat
1080

gaggaattta atcactgggg tggagacgat gtggaatttg gatatcgctt attccgttac
1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa

SEQUENCE LISTING.ST25.txt

1200

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1320

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1380

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1440

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1500

tctaaaccaa atggcggaat agcctcagca tcaaatgcag ccgtttcttt tgctaaaggt
1560

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1620

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1680

aatccggatg gtagcttaat cgctaattgg tacaattggc cagaattttc acgagaaaaa
1740

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1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatggt cctcaaactc
1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt
1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
2040

gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta
2100

aaagatatatt aa

SEQUENCE LISTING.ST25.txt

2112

<210> 46

<211> 2112

<212> DNA

<213> Pasteurella multocida

<400> 46

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60

aaattatttg aaaagtcggc ggaaatctat ggacggaaaa ttggtgaatt tcaaattacc
120

aatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcgatagt ccggttagata ttgcaacaca actgttactt
240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg
300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca
360

aaagattttc ccaaagatct ggttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat

SEQUENCE LISTING.ST25.txt

720

gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat
780

gttgcagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat
840

acacaacata ttgacccaaa agacttctta aataacgcga gtttgcttga atcattacca
900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

tttgccggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat
1080

gaggaattta atcactgggg tggacaagat gtggaatttg gatatcgctt attccgttac
1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa
1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
1260

gtcccttata tctatagaaa acttttacca atagaagatt cgcatatcaa tagagtacct
1320

ttagtttcaa tttatatccc agcttataac tgtgcaaact atattcaacg ttgcgtagat
1380

agtgcactga atcagactgt tgttgatctc gaggtttgta tttgtaacga tggttcaaca
1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggt acgcatcatg
1500

tctaaaccaa atggcggaat agcctcagca tcaaagcag ccgtttcttt tgctaaaggt
1560

tattacattg ggcagttaga ttcagatgat tatcttgagc ctgatgcagt tgaactgtgt
1620

ttaaaagaat ttttaaaaga taaaacgcta gcttgtgttt ataccactaa tagaaacgtc

SEQUENCE LISTING.ST25.txt

1680

aatccggatg gtagcttaat cgctaattggt tacaattggc cagaattttc acgagaaaaa
1740

ctcacaacgg ctatgattgc tcaccacttt agaattgtca cgattagagc ttggcattta
1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatggt cctcaaactc
1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt
1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
2040

gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta
2100

aaagatatatt aa
2112

<210> 47

<211> 2112

<212> DNA

<213> Pasteurella multocida

<400> 47

atgaatacat tatcacaagc aataaaagca tataacagca atgactatca attagcactc
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aaattatttg aaaagtcggc ggaaatctat ggacggaaaa ttgttgaatt tcaaattacc
120

aaatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcatagat ccgttagata ttgcaacaca actgttactt

SEQUENCE LISTING.ST25.txt

240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg
300

aaattgctca ctgagaagaa atctgaaaat gcggaggttaa gagcggtcgc ccttgtacca
360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat
720

gactttattg gcttactcga ctgtgatatg gcgcctaatc cattatgggt tcattcttat
780

gttgcagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat
840

acacaacata ttgacccaaa agactttctta aataacgcga gtttgcttga atcattacca
900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

tttgcggcgg gtaatgttgc ttctgctaaa aaatggctaa ataaatccgg tttctttgat
1080

gaggaattta atcactgggg tggacacgat gtggaatttg gatatcgctt attccgttac
1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa

SEQUENCE LISTING.ST25.txt

1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
1260

gtcccttata tctatagaaa acttttacca atagaagatt cgcatatcaa tagagtacct
1320

ttagtttcaa tttatatccc agcttataac tgtgcaaact atattcaacg ttgcgtagat
1380

agtgcactga atcagactgt tgttgatctc gaggtttgta tttgtaacga tggttcaaca
1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggt acgcatcatg
1500

tctaaaccaa atggcggaat agcctcagca tcaaatgcag ccgtttcttt tgctaaagggt
1560

tattacattg ggcagttaga ttcagatgat tatcttgagc ctgatgcagt tgaactgtgt
1620

ttaaaagaat ttttaaaaga taaaacgcta gcttgtgttt ataccactaa tagaaacgtc
1680

aatccggatg gtagcttaat cgctaattgg tacaattggc cagaattttc acgagaaaaa
1740

ctcacaacgg ctatgattgc tcaccacttt agaatgttca cgattagagc ttggcattta
1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatggt cctcaaactc
1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt
1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
2040

gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta
2100

aaagatatatt aa

SEQUENCE LISTING.ST25.txt

2112

<210> 48

<211> 2112

<212> DNA

<213> Pasteurella multocida

<400> 48

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aaattatattg aaaagtcggc ggaaatctat ggacggaaaa ttgttgaatt tcaaattacc
120

aatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcgatagt ccggttagata ttgcaacaca actgttactt
240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg
300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca
360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttgggtctt
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat

SEQUENCE LISTING.ST25.txt

720

gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat
780

gttgcaagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat
840

acacaacata ttgacccaaa agacttctta aataacgcga gtttgcttga atcattacca
900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

tttgcggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat
1080

gaggaattta atcactgggg tggagaagaa gtggaatttg gatatcgctt attccgttac
1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa
1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
1260

gtcccttata tctatagaaa actttttacca atagaagatt cgcatatcaa tagagtacct
1320

ttagtttcaa tttatatccc agcttataac tgtgcaaact atattcaacg ttgcgtagat
1380

agtgcactga atcagactgt tgttgatctc gaggtttgta tttgtaacga tggttcaaca
1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggg acgcatcatg
1500

tctaaaccaa atggcggaat agcctcagca tcaaagcag ccgtttcttt tgctaaagggt
1560

tattacattg ggcagttaga ttcagatgat tatcttgagc ctgatgcagt tgaactgtgt
1620

ttaaaagaat ttttaaaaga taaaacgcta gcttggtgtt ataccactaa tagaaacgtc

SEQUENCE LISTING.ST25.txt

1680

aatccggatg gtagcttaat cgctaattggt tacaattggc cagaattttc acgagaaaaa
1740

ctcacaacgg ctatgattgc tcaccacttt agaattgtca cgattagagc ttggcattta
1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatggt cctcaaactc
1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt
1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
2040

gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta
2100

aaagatatatt aa
2112

<210> 49

<211> 2112

<212> DNA

<213> Pasteurella multocida

<400> 49

atgaatacat tatcacaagc aataaaagca tataacagca atgactatca attagcactc
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aaattatttg aaaagtggc ggaaatctat ggacggaaaa ttgttgaatt tcaaattacc
120

aatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcgatagt ccgtagata ttgcaacaca actgttactt

SEQUENCE LISTING.ST25.txt

240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg
300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca
360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat
720

gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat
780

gttgcagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat
840

acacaacata ttgacccaaa agactttcta aataacgcga gtttgcttga atcattacca
900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

tttgcggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat
1080

gaggaattta atcactgggg tggagaaaat gtggaatttg gatatcgctt attccgttac
1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa

SEQUENCE LISTING.ST25.txt

1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
1260

gtcccttata tctatagaaa acttttacca atagaagatt cgcatatcaa tagagtacct
1320

ttagtttcaa tttatatccc agcttataac tgtgcaaact atattcaacg ttgcgtagat
1380

agtgcactga atcagactgt tgttgatctc gaggtttgta tttgtaacga tggttcaaca
1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggt acgcatcatg
1500

tctaaaccaa atggcgggaat agcctcagca tcaaatgcag ccgtttcttt tgctaaaggt
1560

tattacattg ggcagttaga ttcagatgat tatcttgagc ctgatgcagt tgaactgtgt
1620

ttaaaagaat ttttaaaaga taaaacgcta gcttgtgttt ataccactaa tagaaacgtc
1680

aatccggatg gtagcttaat cgctaattgg tacaattggc cagaattttc acgagaaaaa
1740

ctcacaacgg ctatgattgc tcaccacttt agaatgttca cgattagagc ttggcattta
1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatggt cctcaaactc
1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt
1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
2040

gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta
2100

aaagatatatt aa

SEQUENCE LISTING.ST25.txt

2112

<210> 50

<211> 2112

<212> DNA

<213> Pasteurella multocida

<400> 50

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aaattatttg aaaagtcggc ggaaatctat ggacggaaaa ttgttgaatt tcaaattacc
120

aatgcaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcgatagt ccggttagata ttgcaacaca actgttactt
240

tccaacgtaa aaaaattagt actttctgac tcggaaaaaa acacgttaaa aaataaatgg
300

aaattgctca ctgagaagaa atctgaaaat gcggaggtaa gagcggtcgc ccttgtacca
360

aaagattttc ccaagatct ggttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttggtctt
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat

SEQUENCE LISTING.ST25.txt

720

gacttttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat
780

gttgacagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat
840

acacaacata ttgacccaaa agacttctta aataacgcga gtttgcttga atcattacca
900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

tttgcgggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat
1080

gaggaattta atcactgggg tggagaaaaa gtggaatttg gatatcgctt attccgttac
1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa
1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
1260

gtcccttata tctatagaaa actttttacca atagaagatt cgcatatcaa tagagtacct
1320

ttagtttcaa tttatatccc agcttataac tgtgcaaact atattcaacg ttgcgtagat
1380

agtgcactga atcagactgt tgttgatctc gaggtttgta tttgtaacga tggttcaaca
1440

gataatacct tagaagtgat caataagctt tatggtaata atcctagggg acgcatcatg
1500

tctaaaccaa atggcggaat agcctcagca tcaaagtcag ccgtttcttt tgctaaagggt
1560

tattacattg ggcagttaga ttcagatgat tatcttgagc ctgatgcagt tgaactgtgt
1620

ttaaaagaat ttttaaaaga taaaacgcta gcttgtgttt ataccactaa tagaaacgtc

SEQUENCE LISTING.ST25.txt

1680

aatccggatg gtagcttaat cgctaattggg tacaattggc cagaattttc acgagaaaaa
1740

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1800

actgatggat tcaatgaaaa aattgaaaat gccgtagact atgacatggt cctcaaactc
1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgtgt attacatggt
1920

gataacacat caattaagaa acttggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg cataacttat tataattatg acgaatttga tgatttagat
2040

gaaagtagaa agtatatttt caataaaacc gctgaatatc aagaagagat tgatatctta
2100

aaagatatatt aa
2112

<210> 51

<211> 2136

<212> DNA

<213> Pasteurella multocida

<400> 51

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aaattatttg aaaagtcggc ggaaatctat ggacggaaaa ttgttgaatt tcaaattacc
120

aaatgccaaag aaaaactctc agcacatcct tctgttaatt cagcacatct ttctgtaaat
180

aaagaagaaa aagtcaatgt ttgcgatagt ccgtagata ttgcaacaca actgttactt

SEQUENCE LISTING.ST25.txt

240

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300

aaattgctca ctgagaagaa atctgaaaat gcggaggttaa gagcggtcgc ccttgtacca
360

aaagattttc ccaaagatct ggtttttagcg cctttacctg atcatgttaa tgattttaca
420

tggtacaaaa agcgaaagaa aagacttggc ataaaacctg aacatcaaca tgttgggtctt
480

tctattatcg ttacaacatt caatcgacca gcaattttat cgattacatt agcctgttta
540

gtaaaccaaa aaacacatta cccgtttgaa gttatcgtga cagatgatgg tagtcaggaa
600

gatctatcac cgatcattcg ccaatatgaa aataaattgg atattcgcta cgtcagacaa
660

aaagataacg gttttcaagc cagtgccgct cggaatatgg gattacgctt agcaaaatat
720

gactttattg gcttactcga ctgtgatatg gcgccaaatc cattatgggt tcattcttat
780

gttgcagagc tattagaaga tgatgattta acaatcattg gtccaagaaa atacatcgat
840

acacaacata ttgacccaaa agactttcta aataacgcga gtttgcttga atcattacca
900

gaagtgaaaa ccaataatag tgttgccgca aaaggggaag gaacagtttc tctggattgg
960

cgcttagaac aattcgaaaa aacagaaaat ctccgcttat ccgattcgcc tttccgtttt
1020

tttgcggcgg gtaatgttgc tttcgctaaa aaatggctaa ataaatccgg tttctttgat
1080

gaggaattta atcactgggg tggagaagat gtggaatttg gatatcgctt attccgttac
1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa

SEQUENCE LISTING.ST25.txt

1200

gaaaatgaaa ccgatcgtga agcgggaaaa aatattacgc tcgatattat gagagaaaag
1260

gtcccttata tctatagaaa actttttacca atagaagatt cgcattattca tagaataacct
1320

ttagttttcta tttatatccc cgcttataac tgtgcaaatt atattcaaag atgtgtagat
1380

agtgccttta atcaaactgt tgtcgatctc gaggtttgta tttgtaacga tggttcaaca
1440

gataataacct tagaagtgat caataagctt tatggtaata atcctagggt acgcatcatg
1500

tctaaaccaa atggcggaat agcctcagca tcaaatgcag ccgtttcttt tgctaaagg
1560

tattacattg ggcagttaga ttcagatgat tatcttgagc ctgatgcagt tgaactgtgt
1620

ttaaaagaat ttttaaaaga taaaacgcta gcttgtgttt ataccactaa tagaaacgtc
1680

aatccggatg gtagcttaat cgctaattgg tacaattggc cagaattttc acgagaaaaa
1740

ctcacaacgg ctatgattgc tcaccatttt agaatgttta cgattagagc ttggcattta
1800

acggatggat ttaacgaaaa tattgaaaac gccgtggatt atgacatggt ccttaaactc
1860

agtgaagttg gaaaatttaa acatcttaat aaaatctgct ataaccgcgt attacatggt
1920

gataacacat ccattaagaa actcggcatt caaaagaaaa accattttgt tgtagtcaat
1980

cagtcattaa atagacaagg catcaattat tataattatg acaaatttga tgatttagat
2040

gaaagtagaa agtatatctt caataaaacc gctgaatatc aagaagaaat ggatatttta
2100

aaagatctta aactcattca gaataaagat gcctaa

SEQUENCE LISTING.ST25.txt

2136

<210> 52

<211> 2091

<212> DNA

<213> Pasteurella multocida

<400> 52

atgaatacat tatcacaagc aataaaagca tataacagca atgactatga attagcactc
60

aaattatttg agaagtctgc tgaaacctac gggcgaaaaa tcgttgaatt ccaaattatc
120

aaatgtaaag aaaaactctc gaccaattct tatgtaagtg aagataaaaa aaacagtgtt
180

tgcgatagct cattagatat cgcaacacag ctcttacttt ccaacgtaaa aaaattaact
240

ctatccgaat cagaaaaaaaa cagtttataaa aataaatgga aatctatcac tgggaaaaaa
300

tcggagaacg cagaaatcag aaaggtggaa ctagtaccca aagattttcc taaagatctt
360

gttcttgctc cattgccaga tcatgttaat gattttacat ggtacaaaaa tcgaaaaaaa
420

agcttaggta taaagcctgt aaataagaat atcgggtcttt ctattattat tcctacattt
480

aatcgtagcc gtattttaga tataacgtta gcctgtttgg tcaatcagaa aacaaactac
540

ccatttgaag tcgttggtgc agatgatggg agtaaggaaa acttacttac cattgtgcaa
600

aaatacgaac aaaaacttga cataaagtat gtaagacaaa aagattatgg atatcaattg
660

tgtgcagtca gaaacttagg ttacgtaca gcaaagtatg attttgtctc gattctagac

SEQUENCE LISTING.ST25.txt

720

tgcgatatgg caccacaaca attatgggtt cattcttatac ttacagaact attagaagac
780

aatgatattg ttttaattgg acctagaaaa tatgtggata ctcataatat taccgcagaa
840

caattcctta acgatccata tttaatagaa tcactacctg aaaccgctac aaataacaat
900

ccttcgatta catcaaaagg aaatatatcg ttggattgga gattagaaca tttcaaaaaa
960

accgataatc tacgtctatg tgattcacgg tttcggttatt ttagttgcgg taatgttgca
1020

ttttctaaag aatggctaaa taaagtaggt tggttcgatg aagaatttaa tcattggggg
1080

ggcgaagatg tagaatttgg ttacagatta ttgccaag gctgtttttt cagagtaatt
1140

gacggcggaa tggcatacca tcaagaacca cctggtaaag aaaatgaaac agaccgcgaa
1200

gctggtaaaa gtattacgct taaaattgtg aaagaaaagg taccttacat ctatagaaaa
1260

cttttaccaa tagaagattc gcatatcaat agagtacctt tagtttcaat ttatatccca
1320

gcttataact gtgcaaacta tattcaacgt tgcgtagata gtgcactgaa tcagactgtt
1380

gttgatctcg aggtttgtat ttgtaacgat ggttcaacag ataatacctt agaagtgatc
1440

aataagcttt atggtaataa tcctagggtg cgcacatgtg ctaaaccaaa tggcggaata
1500

gcctcagcat caaatgcagc cgtttctttt gctaaagggtt attacattgg gcagttagat
1560

tcagatgatt atcttgagcc tgatgcagtt gaactgtgtt taaaagaatt tttaaaagat
1620

aaaacgctag cttgtgttta taccactaat agaaacgtca atccggatgg tagcttaatc

SEQUENCE LISTING.ST25.txt

1680

gctaattggtt acaattggcc agaattttca cgagaaaaac tcacaacggc tatgattgct
1740

caccacttta gaatgttcac gattagagct tggcatttaa ctgatggatt caatgaaaaa
1800

attgaaaatg ccgtagacta tgacatgttc ctcaaactca gtgaagttgg aaaatttaaa
1860

catcttaata aaatctgcta taaccgtgta ttacatgggtg ataacacatc aattaagaaa
1920

cttggcattc aaaagaaaaa ccattttgtt gtagtcaatc agtcattaaa tagacaaggc
1980

ataacttatt ataattatga cgaatttgat gatttagatg aaagtagaaa gtatatatttc
2040

aataaaaccg ctgaatatca agaagagatt gatatcttaa aagatattta a
2091

<210> 53

<211> 29

<212> DNA

<213> artificial sequence

<220>

<223> primer P1

<400> 53

atgaacacat tatcacaagc aataaaagc
29

<210> 54

<211> 27

<212> DNA

SEQUENCE LISTING.ST25.txt

<213> artificial sequence

<220>

<223> primer P2

<220>

<221> misc_feature

<222> (23)..(23)

<223> Y = C/T

<400> 54
gcgaatcttc tattggtaaa agytttc
27

<210> 55

<211> 26

<212> DNA

<213> artificial sequence

<220>

<223> primer P3

<400> 55
cttttaccaa tagaagattc gcatat
26

<210> 56

<211> 33

<212> DNA

SEQUENCE LISTING.ST25.txt

<213> artificial sequence

<220>

<223> primer P4

<400> 56
gaagacgtct taggcatctt tattctgaat gag
33

<210> 57

<211> 43

<212> DNA

<213> artificial sequence

<220>

<223> primer P5

<400> 57
gggaattctg cagttaaata tcttttaaga tatcaatctc ttc
43

<210> 58

<211> 33

<212> DNA

<213> artificial sequence

<220>

<223> sense primer

<220>

SEQUENCE LISTING.ST25.txt

<221> misc_feature

<222> (9)..(9)

<223> inosine

<220>

<221> misc_feature

<222> (12)..(12)

<223> inosine

<220>

<221> misc_feature

<222> (18)..(18)

<223> inosine

<220>

<221> misc_feature

<222> (24)..(24)

<223> inosine

<220>

<221> misc_feature

<222> (27)..(27)

<223> inosine

SEQUENCE LISTING.ST25.txt

<400> 58
garttybtnm rngarggnaa rgcnnytntay gay
33

<210> 59

<211> 39

<212> DNA

<213> artificial sequence

<220>

<223> antisense primer

<220>

<221> misc_feature

<222> (7)..(7)

<223> inosine

<220>

<221> misc_feature

<222> (10)..(10)

<223> inosine

<220>

<221> misc_feature

<222> (16)..(16)

<223> inosine

SEQUENCE LISTING.ST25.txt

<220>

<221> misc_feature

<222> (22)..(22)

<223> inosine

<220>

<221> misc_feature

<222> (25)..(25)

<223> A, G, C or T

<400> 59

rcartanccn ccartanccra answnggrtt rttrtartg
39

<210> 60

<211> 30

<212> DNA

<213> artificial sequence

<220>

<223> 2nd antisense primer

<400> 60

tatatttaca gcagtatcat tttctaaagg
30

<210> 61

SEQUENCE LISTING.ST25.txt

<211> 501

<212> PRT

<213> Pasteurella multocida

<400> 61

Met Ser Leu Phe Lys Arg Ala Thr Glu Leu Phe Lys Ser Gly Asn Tyr
1 5 10 15

Lys Asp Ala Leu Thr Leu Tyr Glu Asn Ile Ala Lys Ile Tyr Gly Ser
20 25 30

Glu Ser Leu Val Lys Tyr Asn Ile Asp Ile Cys Lys Lys Asn Ile Thr
35 40 45

Gln Ser Lys Ser Asn Lys Ile Glu Glu Asp Asn Ile Ser Gly Glu Asn
50 55 60

Glu Phe Ser Val Ser Ile Lys Asp Leu Tyr Asn Glu Ile Ser Asn Ser
65 70 75 80

Glu Leu Gly Ile Thr Lys Glu Arg Leu Gly Ala Pro Pro Leu Val Ser
85 90 95

Ile Ile Met Thr Ser His Asn Thr Glu Lys Phe Ile Glu Ala Ser Ile
100 105 110

Asn Ser Leu Leu Leu Gln Thr Tyr Asn Asn Leu Glu Val Ile Val Val
115 120 125

Asp Asp Tyr Ser Thr Asp Lys Thr Phe Gln Ile Ala Ser Arg Ile Ala
130 135 140

Asn Ser Thr Ser Lys Val Lys Thr Phe Arg Leu Asn Ser Asn Leu Gly
145 150 155 160

SEQUENCE LISTING.ST25.txt

Thr	Tyr	Phe	Ala	Lys	Asn	Thr	Gly	Ile	Leu	Lys	Ser	Lys	Gly	Asp	Ile	165	170	175
Ile	Phe	Phe	Gln	Asp	Ser	Asp	Asp	Val	Cys	His	His	Glu	Arg	Ile	Glu	180	185	190
Arg	Cys	Val	Asn	Ala	Leu	Leu	Ser	Asn	Lys	Asp	Asn	Ile	Ala	Val	Arg	195	200	205
Cys	Ala	Tyr	Ser	Arg	Ile	Asn	Leu	Glu	Thr	Gln	Asn	Ile	Ile	Lys	Val	210	215	220
Asn	Asp	Asn	Lys	Tyr	Lys	Leu	Gly	Leu	Ile	Thr	Leu	Gly	Val	Tyr	Arg	225	230	235
Lys	Val	Phe	Asn	Glu	Ile	Gly	Phe	Phe	Asn	Cys	Thr	Thr	Lys	Ala	Ser	245	250	255
Asp	Asp	Glu	Phe	Tyr	His	Arg	Ile	Ile	Lys	Tyr	Tyr	Gly	Lys	Asn	Arg	260	265	270
Ile	Asn	Asn	Leu	Phe	Leu	Pro	Leu	Tyr	Tyr	Asn	Thr	Met	Arg	Glu	Asp	275	280	285
Ser	Leu	Phe	Ser	Asp	Met	Val	Glu	Trp	Val	Asp	Glu	Asn	Asn	Ile	Lys	290	295	300
Gln	Lys	Thr	Ser	Asp	Ala	Arg	Gln	Asn	Tyr	Leu	His	Glu	Phe	Gln	Lys	305	310	315
Ile	His	Asn	Glu	Arg	Lys	Phe	Asn	Glu	Leu	Lys	Glu	Ile	Phe	Ser	Phe	325	330	335
Pro	Arg	Ile	His	Asp	Ala	Leu	Pro	Ile	Ser	Lys	Glu	Met	Ser	Lys	Leu	340	345	350

SEQUENCE LISTING.ST25.txt

Ser Asn Pro Lys Ile Pro Val Tyr Ile Asn Ile Cys Ser Ile Pro Ser
355 360 365

Arg Ile Lys Gln Leu Gln Tyr Thr Ile Gly Val Leu Lys Asn Gln Cys
370 375 380

Asp His Phe His Ile Tyr Leu Asp Gly Tyr Pro Glu Val Pro Asp Phe
385 390 395 400

Ile Lys Lys Leu Gly Asn Lys Ala Thr Val Ile Asn Cys Gln Asn Lys
405 410 415

Asn Glu Ser Ile Arg Asp Asn Gly Lys Phe Ile Leu Leu Glu Lys Leu
420 425 430

Ile Lys Glu Asn Lys Asp Gly Tyr Tyr Ile Thr Cys Asp Asp Asp Ile
435 440 445

Arg Tyr Pro Ala Asp Tyr Ile Asn Thr Met Ile Lys Lys Ile Asn Lys
450 455 460

Tyr Asn Asp Lys Ala Ala Ile Gly Leu His Gly Val Ile Phe Pro Ser
465 470 475 480

Arg Val Asn Lys Tyr Phe Ser Ser Asp Arg Ile Val Tyr Asn Phe Gln
485 490 495

Lys Thr Phe Arg Lys
500

<210> 62

<211> 1510

<212> DNA

SEQUENCE LISTING.ST25.txt

<213> Pasteurella multocida

<400> 62

aatgagctta tttaaactg ctactgagct atttaagtca ggaaactata aagatgcact
60

aactctatat gaaaatatag ctaaaattta tggttcagaa agccttggtta aatataatat
120

tgatatatgt aaaaaaata taacacaatc aaaaagtaat aaaatagaag aagataatat
180

ttctggagaa aacgaatttt cagtatcaat aaaagatcta tataacgaaa taagcaatag
240

tgaattaggg attacaaaag aaagactagg agccccccct ctagtcagta ttataatgac
300

ttctcataat acagaaaaat tcattgaagc ctcaattaat tcactattat tgcaaacata
360

caataactta gaagttatcg ttgtagatga ttatagcaca gataaaacat ttcagatcgc
420

atccagaata gcaaactcta caagtaaagt aaaaacattc cgattaaact caaatctagg
480

gacatacttt gcgaaaaata caggaatttt aaagtctaaa ggagatatta ttttctttca
540

ggatagcgat gatgtatgtc accatgaaag aatcgaaaga tgtgttaatg cattattatc
600

gaataaagat aatatagctg ttagatgtgc atattctaga ataaatctag aaacacaaaa
660

tataataaaa gttaatgata ataaatacaa attaggatta ataactttag gcgtttatag
720

aaaagtattt aatgaaattg gtttttttaa ctgcacaacc aaagcatcgg atgatgaatt
780

ttatcataga ataattaaat actatggtaa aaataggata aataacttat ttctaccact
840

gtattataac acaatgcgtg aagattcatt attttctgat atgggttgagt gggtagatga

SEQUENCE LISTING.ST25.txt

900

aaataatata aagcaaaaaa cctctgatgc tagacaaaat tatctccatg aattccaaaa
960

aatacacaaat gaaaggaaat ttaatgaatt aaaagagatt tttagctttc ctagaattca
1020

tgacgcctta cctatatcaa aagaaatgag taagctcagc aaccctaaaa ttcctgttta
1080

tataaatata tgctcaatac ctccaagaat aaaacaactt caatacacta ttggagtact
1140

aaaaaaccaa tgcgatcatt ttcatattta tcttgatgga tatccagaag tacctgattt
1200

tataaaaaaa ctagggaata aagcgaccgt tattaattgt caaaacaaaa atgagtctat
1260

tagagataat ggaaagttaa ttctattaga aaaacttata aaggaaaata aagatggata
1320

ttatataact tgtgatgatg atatccggta tcttgctgac tacataaaca ctatgataaa
1380

aaaaattaat aaatacaatg ataaagcagc aattggatta catggtgtta tattcccaag
1440

tagagtcaac aagtatTTTT catcagacag aattgtctat aattttcaaa aaacctttag
1500

aaaatgatac
1510

<210> 63

<211> 238

<212> PRT

<213> Escherichia coli

<400> 63

SEQUENCE LISTING.ST25.txt

Met	Ile	Val	Ala	Asn	Met	Ser	Ser	Tyr	Pro	Pro	Arg	Lys	Lys	Glu	Leu	1	5	10	15
Val	His	Ser	Ile	Gln	Ser	Leu	His	Ala	Gln	Val	Asp	Lys	Ile	Asn	Leu	20	25	30	
Cys	Leu	Asn	Glu	Phe	Glu	Glu	Ile	Pro	Glu	Glu	Leu	Asp	Gly	Phe	Ser	35	40	45	
Lys	Leu	Asn	Pro	Val	Ile	Pro	Asp	Lys	Asp	Tyr	Lys	Asp	Val	Gly	Lys	50	55	60	
Phe	Ile	Phe	Pro	Cys	Ala	Lys	Asn	Asp	Met	Ile	Val	Leu	Thr	Asp	Asp	65	70	75	80
Asp	Ile	Ile	Tyr	Pro	Pro	Asp	Tyr	Val	Glu	Lys	Met	Leu	Asn	Phe	Tyr	85	90	95	
Asn	Ser	Phe	Ala	Ile	Phe	Asn	Cys	Ile	Val	Gly	Ile	His	Gly	Cys	Ile	100	105	110	
Tyr	Ile	Asp	Ala	Phe	Asp	Gly	Asp	Gln	Ser	Lys	Arg	Lys	Val	Phe	Ser	115	120	125	
Phe	Thr	Gln	Gly	Leu	Leu	Arg	Pro	Arg	Val	Val	Asn	Gln	Leu	Gly	Thr	130	135	140	
Gly	Thr	Val	Phe	Leu	Lys	Ala	Asp	Gln	Leu	Pro	Ser	Leu	Lys	Tyr	Met	145	150	155	160
Asp	Gly	Ser	Gln	Arg	Phe	Val	Asp	Val	Arg	Phe	Ser	Arg	Tyr	Met	Leu	165	170	175	
Glu	Asn	Glu	Ile	Gly	Met	Ile	Cys	Val	Pro	Arg	Glu	Lys	Asn	Trp	Leu	180	185	190	

SEQUENCE LISTING.ST25.txt

Arg Glu Val Ser Ser Gly Ser Met Glu Gly Leu Trp Asn Thr Phe Thr
195 200 205

Lys Lys Trp Pro Leu Asp Ile Ile Lys Glu Thr Gln Ala Ile Ala Gly
210 215 220

Tyr Ser Lys Leu Asn Leu Glu Leu Val Tyr Asn Val Glu Gly
225 230 235

<210> 64

<211> 520

<212> PRT

<213> Escherichia coli

<400> 64

Met Asn Ala Glu Tyr Ile Asn Leu Val Glu Arg Lys Lys Lys Leu Gly
1 5 10 15

Thr Asn Ile Gly Ala Leu Asp Phe Leu Leu Ser Ile His Lys Glu Lys
20 25 30

Val Asp Leu Gln His Lys Asn Ser Pro Leu Lys Gly Asn Asp Asn Leu
35 40 45

Ile His Lys Arg Ile Asn Glu Tyr Asp Asn Val Leu Glu Leu Ser Lys
50 55 60

Asn Val Ser Ala Gln Asn Ser Gly Asn Glu Phe Ser Tyr Leu Leu Gly
65 70 75 80

Tyr Ala Asp Ser Leu Arg Lys Val Gly Met Leu Asp Thr Tyr Ile Lys
85 90 95

SEQUENCE LISTING.ST25.txt

Ile Val Cys Tyr Leu Thr Ile Gln Ser Arg Tyr Phe Lys Asn Gly Glu
100 105 110

Arg Val Lys Leu Phe Glu His Ile Ser Asn Ala Leu Arg Tyr Ser Arg
115 120 125

Ser Asp Phe Leu Ile Asn Leu Ile Phe Glu Arg Tyr Ile Glu Tyr Ile
130 135 140

Asn His Leu Lys Leu Ser Pro Lys Gln Lys Asp Phe Tyr Phe Cys Thr
145 150 155 160

Lys Phe Ser Lys Phe His Asp Tyr Thr Lys Asn Gly Tyr Lys Tyr Leu
165 170 175

Ala Phe Asp Asn Gln Ala Asp Ala Gly Tyr Gly Leu Thr Leu Leu Leu
180 185 190

Asn Ala Asn Asp Asp Met Gln Asp Ser Tyr Asn Leu Leu Pro Glu Gln
195 200 205

Glu Leu Phe Ile Cys Asn Ala Val Ile Asp Asn Met Asn Ile Tyr Arg
210 215 220

Ser Gln Phe Asn Lys Cys Leu Arg Lys Tyr Asp Leu Ser Glu Ile Thr
225 230 235 240

Asp Ile Tyr Pro Asn Lys Ile Ile Leu Gln Gly Ile Lys Phe Asp Lys
245 250 255

Lys Lys Asn Val Tyr Gly Lys Asp Leu Val Ser Ile Ile Met Ser Val
260 265 270

Phe Asn Ser Glu Asp Thr Ile Ala Tyr Ser Leu His Ser Leu Leu Asn
275 280 285

SEQUENCE LISTING.ST25.txt

Gln	Thr	Tyr	Glu	Asn	Ile	Glu	Ile	Leu	Val	Cys	Asp	Asp	Cys	Ser	Ser	290	295	300
Asp	Lys	Ser	Leu	Glu	Ile	Ile	Lys	Ser	Ile	Ala	Tyr	Ser	Ser	Ser	Arg	305	310	315
Val	Lys	Val	Tyr	Ser	Ser	Arg	Lys	Asn	Gln	Gly	Pro	Tyr	Asn	Ile	Arg	325	330	335
Asn	Glu	Leu	Ile	Lys	Lys	Ala	His	Gly	Asn	Phe	Ile	Thr	Phe	Gln	Asp	340	345	350
Ala	Asp	Asp	Leu	Ser	His	Pro	Glu	Arg	Ile	Gln	Arg	Gln	Val	Glu	Val	355	360	365
Leu	Arg	Asn	Asn	Lys	Ala	Val	Ile	Cys	Met	Ala	Asn	Trp	Ile	Arg	Val	370	375	380
Ala	Ser	Asn	Gly	Lys	Ile	Gln	Phe	Phe	Tyr	Asp	Asp	Lys	Ala	Thr	Arg	385	390	395
Met	Ser	Val	Val	Ser	Ser	Met	Ile	Lys	Lys	Asp	Ile	Phe	Ala	Thr	Val	405	410	415
Gly	Gly	Tyr	Arg	Gln	Ser	Leu	Ile	Gly	Ala	Asp	Thr	Glu	Phe	Tyr	Glu	420	425	430
Thr	Val	Ile	Met	Arg	Tyr	Gly	Arg	Glu	Ser	Ile	Val	Arg	Leu	Leu	Gln	435	440	445
Pro	Leu	Ile	Leu	Gly	Leu	Trp	Gly	Asp	Ser	Gly	Leu	Thr	Arg	Asn	Lys	450	455	460
Gly	Thr	Glu	Ala	Leu	Pro	Asp	Gly	Tyr	Ile	Ser	Gln	Ser	Arg	Arg	Glu	465	470	475

SEQUENCE LISTING.ST25.txt

Tyr Ser Asp Ile Ala Ala Arg Gln Arg Val Leu Gly Lys Ser Ile Val
 485 490 495

Ser Asp Lys Asp Val Arg Gly Leu Leu Ser Arg Tyr Gly Leu Phe Lys
 500 505 510

Asp Val Ser Gly Ile Ile Glu Gln
 515 520

<210> 65

<211> 746

<212> PRT

<213> Mus musculus

<400> 65

Met Gln Ala Lys Lys Arg Tyr Phe Ile Leu Leu Ser Ala Gly Ser Cys
 1 5 10 15

Leu Ala Leu Leu Phe Tyr Phe Gly Gly Val Gln Phe Arg Ala Ser Arg
 20 25 30

Ser His Ser Arg Arg Glu Glu His Ser Gly Arg Asn Gly Leu His Gln
 35 40 45

Pro Ser Pro Asp His Phe Trp Pro Arg Phe Pro Asp Ala Leu Arg Pro
 50 55 60

Phe Phe Pro Trp Asp Gln Leu Glu Asn Glu Asp Ser Ser Val His Ile
 65 70 75 80

Ser Pro Arg Gln Lys Arg Asp Ala Asn Ser Ser Ile Tyr Lys Gly Lys
 85 90 95

SEQUENCE LISTING.ST25.txt

Lys Cys Arg Met Glu Ser Cys Phe Asp Phe Thr Leu Cys Lys Lys Asn
100 105 110

Gly Phe Lys Val Tyr Val Tyr Pro Gln Gln Lys Gly Glu Lys Ile Ala
115 120 125

Glu Ser Tyr Gln Asn Ile Leu Ala Ala Ile Glu Gly Ser Arg Phe Tyr
130 135 140

Thr Ser Asp Pro Ser Gln Ala Cys Leu Phe Val Leu Ser Leu Asp Thr
145 150 155 160

Leu Asp Arg Asp Gln Leu Ser Pro Gln Tyr Val His Asn Leu Arg Ser
165 170 175

Lys Val Gln Ser Leu His Leu Trp Asn Asn Gly Arg Asn His Leu Ile
180 185 190

Phe Asn Leu Tyr Ser Gly Thr Trp Pro Asp Tyr Thr Glu Asp Val Gly
195 200 205

Phe Asp Ile Gly Gln Ala Met Leu Ala Lys Ala Ser Ile Ser Thr Glu
210 215 220

Asn Phe Arg Pro Asn Phe Asp Val Ser Ile Pro Leu Phe Ser Lys Asp
225 230 235 240

His Pro Arg Thr Gly Gly Glu Arg Gly Phe Leu Lys Phe Asn Thr Ile
245 250 255

Pro Pro Leu Arg Lys Tyr Met Leu Val Phe Lys Gly Lys Arg Tyr Leu
260 265 270

Thr Gly Ile Gly Ser Asp Thr Arg Asn Ala Leu Tyr His Val His Asn
275 280 285

SEQUENCE LISTING.ST25.txt

Gly	Glu	Asp	Val	Leu	Leu	Leu	Thr	Thr	Cys	Lys	His	Gly	Lys	Asp	Trp	290	295	300
Gln	Lys	His	Lys	Asp	Ser	Arg	Cys	Asp	Arg	Asp	Asn	Thr	Glu	Tyr	Glu	305	310	315
Lys	Tyr	Asp	Tyr	Arg	Glu	Met	Leu	His	Asn	Ala	Thr	Phe	Cys	Leu	Val	325	330	335
Pro	Arg	Gly	Arg	Arg	Leu	Gly	Ser	Phe	Arg	Phe	Leu	Glu	Ala	Leu	Gln	340	345	350
Ala	Ala	Cys	Val	Pro	Val	Met	Leu	Ser	Asn	Gly	Trp	Glu	Leu	Pro	Phe	355	360	365
Ser	Glu	Val	Ile	Asn	Trp	Asn	Gln	Ala	Ala	Val	Ile	Gly	Asp	Glu	Arg	370	375	380
Leu	Leu	Leu	Gln	Ile	Pro	Ser	Thr	Ile	Arg	Ser	Ile	His	Gln	Asp	Lys	385	390	395
Ile	Leu	Ala	Leu	Arg	Gln	Gln	Thr	Gln	Phe	Leu	Trp	Glu	Ala	Tyr	Phe	405	410	415
Ser	Ser	Val	Glu	Lys	Ile	Val	Leu	Thr	Thr	Leu	Glu	Ile	Ile	Gln	Asp	420	425	430
Arg	Ile	Phe	Lys	His	Ile	Ser	Arg	Asn	Ser	Leu	Ile	Trp	Asn	Lys	His	435	440	445
Pro	Gly	Gly	Leu	Phe	Val	Leu	Pro	Gln	Tyr	Ser	Ser	Tyr	Leu	Gly	Asp	450	455	460
Phe	Pro	Tyr	Tyr	Tyr	Ala	Asn	Leu	Gly	Leu	Lys	Pro	Pro	Ser	Lys	Phe	465	470	475

SEQUENCE LISTING.ST25.txt

Thr Ala Val Ile His Ala Val Thr Pro Leu Val Ser Gln Ser Gln Pro
485 490 495

Val Leu Lys Leu Leu Val Ala Ala Ala Lys Ser Gln Tyr Cys Ala Gln
500 505 510

Ile Ile Val Leu Trp Asn Cys Asp Lys Pro Leu Pro Ala Lys His Arg
515 520 525

Trp Pro Ala Thr Ala Val Pro Val Ile Val Ile Glu Gly Glu Ser Lys
530 535 540

Val Met Ser Ser Arg Phe Leu Pro Tyr Asp Asn Ile Ile Thr Asp Ala
545 550 555 560

Val Leu Ser Leu Asp Glu Asp Thr Val Leu Ser Thr Thr Glu Val Asp
565 570 575

Phe Ala Phe Thr Val Trp Gln Ser Phe Pro Glu Arg Ile Val Gly Tyr
580 585 590

Pro Ala Arg Ser His Phe Trp Asp Asn Ser Lys Glu Arg Trp Gly Tyr
595 600 605

Thr Ser Lys Trp Thr Asn Asp Tyr Ser Met Val Leu Thr Gly Ala Ala
610 615 620

Ile Tyr His Lys Tyr Tyr His Tyr Leu Tyr Ser His Tyr Leu Pro Ala
625 630 635 640

Ser Leu Lys Asn Met Val Asp Gln Leu Ala Asn Cys Glu Asp Ile Leu
645 650 655

Met Asn Phe Leu Val Ser Ala Val Thr Lys Leu Pro Pro Ile Lys Val
660 665 670

SEQUENCE LISTING.ST25.txt

Thr Gln Lys Lys Gln Tyr Lys Glu Thr Met Met Gly Gln Thr Ser Arg
675 680 685

Ala Ser Arg Trp Ala Asp Pro Asp His Phe Ala Gln Arg Gln Ser Cys
690 695 700

Met Asn Thr Phe Ala Ser Trp Phe Gly Tyr Met Pro Leu Ile His Ser
705 710 715 720

Gln Met Arg Leu Asp Pro Val Leu Phe Lys Asp Gln Val Ser Ile Leu
725 730 735

Arg Lys Lys Tyr Arg Asp Ile Glu Arg Leu
740 745

<210> 66

<211> 718

<212> PRT

<213> Mus musculus

<400> 66

Met Cys Ala Ser Val Lys Ser Asn Ile Arg Gly Pro Ala Leu Ile Pro
1 5 10 15

Arg Met Lys Thr Lys His Arg Ile Tyr Tyr Val Thr Leu Phe Ser Ile
20 25 30

Val Leu Leu Gly Leu Ile Ala Thr Gly Met Phe Gln Phe Trp Pro His
35 40 45

Ser Ile Glu Ser Ser Ser Asp Gly Gly Val Glu Lys Arg Ser Ile Arg
50 55 60

SEQUENCE LISTING.ST25.txt

Glu Val Pro Val Val Arg Leu Pro Thr Asp Ser Pro Ile Pro Glu Arg
65 70 75 80

Gly Asp Leu Ser Cys Arg Met His Thr Cys Phe Asp Val Tyr Arg Cys
85 90 95

Gly Phe Asn Pro Lys Asn Lys Ile Lys Val Tyr Ile Tyr Pro Leu Lys
100 105 110

Lys Tyr Val Asp Asp Ala Gly Val Pro Val Ser Ser Ala Ile Ser Arg
115 120 125

Glu Tyr Asn Glu Leu Leu Thr Ala Ile Ser Asp Ser Asp Tyr Tyr Thr
130 135 140

Asp Asp Ile Asn Arg Ala Cys Leu Phe Val Pro Ser Ile Asp Val Leu
145 150 155 160

Asn Gln Asn Pro Leu Arg Ile Lys Glu Thr Ala Gln Ala Leu Ala Gln
165 170 175

Leu Ser Arg Trp Asp Arg Gly Thr Asn His Leu Leu Phe Asn Met Leu
180 185 190

Pro Gly Ala Pro Pro Asp Tyr Asn Thr Ala Leu Asp Val Pro Arg Asp
195 200 205

Arg Ala Leu Leu Ala Gly Gly Gly Phe Ser Thr Trp Thr Tyr Arg Gln
210 215 220

Gly Tyr Asp Val Ser Ile Pro Val Phe Ser Pro Leu Ser Ala Glu Met
225 230 235 240

Ala Leu Pro Glu Lys Ala Pro Gly Pro Arg Arg Tyr Phe Leu Leu Ser
245 250 255

SEQUENCE LISTING.ST25.txt

Ser Gln Met Ala Ile His Pro Glu Tyr Arg Glu Glu Leu Glu Ala Leu
260 265 270

Gln Ala Lys His Gln Glu Ser Val Leu Val Leu Asp Lys Cys Thr Asn
275 280 285

Leu Ser Glu Gly Val Leu Ser Val Arg Lys Arg Cys His Gln His Gln
290 295 300

Val Phe Asp Tyr Pro Gln Val Leu Gln Glu Ala Thr Phe Cys Thr Val
305 310 315 320

Leu Arg Arg Ala Arg Leu Gly Gln Ala Val Leu Ser Asp Val Leu Gln
325 330 335

Ala Gly Cys Val Pro Val Val Ile Ala Asp Ser Tyr Ile Leu Pro Phe
340 345 350

Ser Glu Val Leu Asp Trp Lys Lys Ala Ser Val Val Val Pro Glu Glu
355 360 365

Lys Met Ser Asp Val Tyr Ser Ile Leu Gln Asn Ile Pro Gln Arg Gln
370 375 380

Ile Glu Glu Met Gln Arg Gln Ala Arg Trp Phe Trp Glu Ala Tyr Phe
385 390 395 400

Gln Ser Ile Lys Ala Ile Ala Leu Ala Thr Leu Gln Ile Ile Asn Asp
405 410 415

Arg Ile Tyr Pro Tyr Ala Ala Ile Ser Tyr Glu Glu Trp Asn Asp Pro
420 425 430

Pro Ala Val Lys Trp Ala Ser Val Ser Asn Pro Leu Phe Leu Pro Leu
435 440 445

SEQUENCE LISTING.ST25.txt

Ile	Pro	Pro	Gln	Ser	Gln	Gly	Phe	Thr	Ala	Ile	Val	Leu	Thr	Tyr	Asp		
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Arg	Val	Glu	Ser	Leu	Phe	Arg	Val	Ile	Thr	Glu	Val	Ser	Lys	Val	Pro		
465					470					475					480		
Ser	Leu	Ser	Lys	Leu	Leu	Val	Val	Trp	Asn	Asn	Gln	Asn	Lys	Asn	Pro		
				485					490					495			
Pro	Glu	Glu	Ser	Leu	Trp	Pro	Lys	Ile	Arg	Val	Pro	Leu	Lys	Val	Val		
			500					505					510				
Arg	Thr	Ala	Glu	Asn	Lys	Leu	Ser	Asn	Arg	Phe	Phe	Pro	Tyr	Asp	Glu		
		515					520					525					
Ile	Glu	Thr	Glu	Ala	Val	Leu	Ala	Ile	Asp	Asp	Asp	Ile	Ile	Met	Leu		
	530					535					540						
Thr	Ser	Asp	Glu	Leu	Gln	Phe	Gly	Tyr	Glu	Val	Trp	Arg	Glu	Phe	Pro		
545					550					555					560		
Asp	Arg	Leu	Val	Gly	Tyr	Pro	Gly	Arg	Leu	His	Leu	Trp	Asp	His	Glu		
				565					570					575			
Met	Asn	Lys	Trp	Lys	Tyr	Glu	Ser	Glu	Trp	Thr	Asn	Glu	Val	Ser	Met		
			580					585					590				
Val	Leu	Thr	Gly	Ala	Ala	Phe	Tyr	His	Lys	Tyr	Phe	Asn	Tyr	Leu	Tyr		
		595					600					605					
Thr	Tyr	Lys	Met	Pro	Gly	Asp	Ile	Lys	Asn	Trp	Val	Asp	Ala	His	Met		
	610					615					620						
Asn	Cys	Glu	Asp	Ile	Ala	Met	Asn	Phe	Leu	Val	Ala	Asn	Val	Thr	Gly		
625					630					635					640		

SEQUENCE LISTING.ST25.txt

Lys Ala Val Ile Lys Val Thr Pro Arg Lys Lys Phe Lys Cys Pro Glu
645 650 655

Cys Thr Ala Ile Asp Gly Leu Ser Leu Asp Gln Thr His Met Val Glu
660 665 670

Arg Ser Glu Cys Ile Asn Lys Phe Ala Ser Val Phe Gly Thr Met Pro
675 680 685

Leu Lys Val Val Glu His Arg Ala Asp Pro Val Leu Tyr Lys Asp Asp
690 695 700

Phe Pro Glu Lys Leu Lys Ser Phe Pro Asn Ile Gly Ser Leu
705 710 715

<210> 67

<211> 76

<212> PRT

<213> Artificial Sequence

<220>

<223> motif

<220>

<221> MISC_FEATURE

<222> (4)..(4)

<223> ANY AMINO ACID

<220>

<221> MISC_FEATURE

SEQUENCE LISTING.ST25.txt

<222> (6)..(6)

<223> Leu or Ile

<220>

<221> MISC_FEATURE

<222> (8)..(11)

<223> any amino acid

<220>

<221> MISC_FEATURE

<222> (14)..(14)

<223> any amino acid

<220>

<221> MISC_FEATURE

<222> (15)..(15)

<223> Ser or Thr

<220>

<221> MISC_FEATURE

<222> (16)..(16)

<223> Ser or Thr

<220>

SEQUENCE LISTING.ST25.txt

<221> MISC_FEATURE

<222> (18)..(18)

<223> Lys or Asn

<220>

<221> MISC_FEATURE

<222> (19)..(19)

<223> Thr or Ser

<220>

<221> MISC_FEATURE

<222> (20)..(25)

<223> any amino acid

<220>

<221> MISC_FEATURE

<222> (28)..(28)

<223> any amino acid

<220>

<221> MISC_FEATURE

<222> (29)..(31)

<223> Ser or Thr

SEQUENCE LISTING.ST25.txt

<220>

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<222> (32)..(32)

<223> Lys or Arg

<220>

<221> MISC_FEATURE

<222> (34)..(34)

<223> Lys or Arg

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<221> MISC_FEATURE

<222> (35)..(40)

<223> any amino acid

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<221> MISC_FEATURE

<222> (42)..(42)

<223> any amino acid

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<221> MISC_FEATURE

<222> (44)..(44)

<223> any amino acid

SEQUENCE LISTING.ST25.txt

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<222> (46)..(61)

<223> any amino acid

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<221> MISC_FEATURE

<222> (65)..(65)

<223> any amino acid

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<221> MISC_FEATURE

<222> (68)..(68)

<223> any amino acid

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<221> MISC_FEATURE

<222> (69)..(69)

<223> Cys or Ser

<220>

<221> MISC_FEATURE

<222> (71)..(71)

SEQUENCE LISTING.ST25.txt

<223> His or Pro

<220>

<221> MISC_FEATURE

<222> (75)..(75)

<223> any amino acid

<400> 67

Gln	Thr	Tyr	Xaa	Asn	Xaa	Glu	Xaa	Xaa	Xaa	Xaa	Asp	Asp	Xaa	Xaa	Xaa
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Asp	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Ile	Ala	Xaa	Xaa	Xaa	Xaa	Xaa
			20					25						30		

Val	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Asn	Xaa	Gly	Xaa	Tyr	Xaa	Xaa	Xaa
		35					40					45			

Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Phe	Gln	Asp
		50					55					60				

Xaa	Asp	Asp	Xaa	Xaa	His	Xaa	Glu	Arg	Ile	Xaa	Arg
65					70					75	

<210> 68

<211> 102

<212> PRT

<213> Artificial Sequence

<220>

SEQUENCE LISTING.ST25.txt

<223> motif

<220>

<221> MISC_FEATURE

<222> (1)..(1)

<223> Lys or Arg

<220>

<221> MISC_FEATURE

<222> (3)..(3)

<223> any amino acid

<220>

<221> MISC_FEATURE

<222> (8)..(19)

<223> each position may be any amino acid

<220>

<221> MISC_FEATURE

<222> (20)..(24)

<223> may be missing from sequence; each position may be any amino acid

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<221> MISC_FEATURE

<222> (20)..(24)

SEQUENCE LISTING.ST25.txt

<223> all or part of sequence comprising residues 20-24 may be missing;
each position may be any amino acid

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<221> MISC_FEATURE

<222> (29)..(29)

<223> Arg or Ile

<220>

<221> MISC_FEATURE

<222> (32)..(32)

<223> any amino acid

<220>

<221> MISC_FEATURE

<222> (35)..(37)

<223> any amino acid

<220>

<221> MISC_FEATURE

<222> (39)..(84)

<223> each position may be any amino acid

<220>

SEQUENCE LISTING.ST25.txt

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<222> (85)..(94)

<223> all or part of sequence comprising residues 85-94 may be missing;

each position may be any amino acid

<220>

<221> MISC_FEATURE

<222> (96)..(96)

<223> any amino acid

<400> 68

Xaa	Asp	Xaa	Gly	Lys	Phe	Ile	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
1				5					10						15	

Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Asp	Asp	Asp	Ile	Xaa	Tyr	Pro	Xaa
			20						25					30		

Asp	Tyr	Xaa	Xaa	Xaa	Met	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
		35						40						45		

Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
		50					55					60				

Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
65						70					75					80

Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Val	Asn	Xaa
				85						90					95	

Leu Gly Thr Gly Thr Val

SEQUENCE LISTING.ST25.txt

100

<210> 69

<211> 1854

<212> DNA

<213> Pasteurella multocida

<400> 69

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120

gatatatgta aaaaaaatat aacacaatca aaaagtaata aaatagaaga agataatatt
180

tctggagaaa acaaattttc agtatcaata aaagatctat ataacgaaat aagcaatagt
240

gaattaggga ttacaaaaga aagactagga gccccccctc tagtcagtat tataatgact
300

tctcataata cagaaaaatt cattgaagcc tcaattaatt cactattatt gcaaacatac
360

aataacttag aagttatcgt ttagatgat tatagcacag ataaaacatt tcagatcgca
420

tccagaatag caaactctac aagtaaagta aaaacattcc gattaaactc aaatctaggg
480

acatactttg cgaaaaatac aggaatttta aagtctaaag gagatattat tttctttcag
540

gatagcgatg atgtatgtca ccatgaaaga atcgaaagat gtgttaatgc attattatcg
600

aataaagata atatagctgt tagatgtgca tattctagaa taaatctaga aacacaaaat
660

ataataaaag ttaatgataa taaatacaaa ttaggattaa taactttagg cgtttataga

SEQUENCE LISTING.ST25.txt

720

aaagtattta atgaaattgg tttttttaac tgcacaacca aagcatcgga tgatgaattt
780

tatcatagaa taattaaata ctatggtaaa aataggataa ataacttatt tctaccactg
840

tattataaca caatgcgtga agattcatta ttttctgata tggttgagtg ggtagatgaa
900

aataatataa agcaaaaaac ctctgatgct agacaaaatt atctccatga attccaaaaa
960

atacacaatg aaaggaaatt aatgaatta aaagagattt ttagctttcc tagaattcat
1020

gacgccttac ctatatcaaa agaatgagt aagctcagca accctaaaat tcctgtttat
1080

ataaatatat gctcaatacc ttcaagaata aaacaacttc aatacactat tggagtacta
1140

aaaaaccaat gcgatcattt tcatatttat cttgatggat atccagaagt acctgatttt
1200

ataaaaaaac tagggaataa agcgaccgtt attaattgtc aaaacaaaaa tgagtctatt
1260

agagataatg gaaagtttat tctattagaa aaacttataa aggaaaataa agatggatat
1320

tatataactt gtgatgatga tatccggtat cctgctgact acataaacac tatgataaaa
1380

aaaattaata aatacaatga taaagcagca attggattac atggtgttat attcccaagt
1440

agagtcaaca agtatTTTTc atcagacaga attgtctata attttcaaaa accttagaa
1500

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1560

aataaatttt ctctatctga ttttgagcat cctggcatgg tagatatcta ttttctata
1620

ctatgtaaga aaaacaatat actccaagtt tgtatatcac gaccatcgaa ttggctaaca

SEQUENCE LISTING.ST25.txt

1680

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1740

agtaaactca ttatttcaaa caacccttgg ggataactcaa gtatatatcc attattaaat
1800

aataatgcta attattctga acttattccg tgtttatctt tttataacga gtaa
1854

<210> 70

<211> 617

<212> PRT

<213> Pasteurella multocida

<400> 70

Met	Ser	Leu	Phe	Lys	Arg	Ala	Thr	Glu	Leu	Phe	Lys	Ser	Gly	Asn	Tyr
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Lys	Asp	Ala	Leu	Thr	Leu	Tyr	Glu	Asn	Ile	Ala	Lys	Ile	Tyr	Gly	Ser
			20					25						30	

Glu	Ser	Leu	Val	Lys	Tyr	Asn	Ile	Asp	Ile	Cys	Lys	Lys	Asn	Ile	Thr
		35					40					45			

Gln	Ser	Lys	Ser	Asn	Lys	Ile	Glu	Glu	Asp	Asn	Ile	Ser	Gly	Glu	Asn
	50					55					60				

Lys	Phe	Ser	Val	Ser	Ile	Lys	Asp	Leu	Tyr	Asn	Glu	Ile	Ser	Asn	Ser
65					70					75					80

Glu	Leu	Gly	Ile	Thr	Lys	Glu	Arg	Leu	Gly	Ala	Pro	Pro	Leu	Val	Ser
				85					90					95	

SEQUENCE LISTING.ST25.txt

Ile Ile Met Thr Ser His Asn Thr Glu Lys Phe Ile Glu Ala Ser Ile
100 105 110

Asn Ser Leu Leu Leu Gln Thr Tyr Asn Asn Leu Glu Val Ile Val Val
115 120 125

Asp Asp Tyr Ser Thr Asp Lys Thr Phe Gln Ile Ala Ser Arg Ile Ala
130 135 140

Asn Ser Thr Ser Lys Val Lys Thr Phe Arg Leu Asn Ser Asn Leu Gly
145 150 155 160

Thr Tyr Phe Ala Lys Asn Thr Gly Ile Leu Lys Ser Lys Gly Asp Ile
165 170 175

Ile Phe Phe Gln Asp Ser Asp Asp Val Cys His His Glu Arg Ile Glu
180 185 190

Arg Cys Val Asn Ala Leu Leu Ser Asn Lys Asp Asn Ile Ala Val Arg
195 200 205

Cys Ala Tyr Ser Arg Ile Asn Leu Glu Thr Gln Asn Ile Ile Lys Val
210 215 220

Asn Asp Asn Lys Tyr Lys Leu Gly Leu Ile Thr Leu Gly Val Tyr Arg
225 230 235 240

Lys Val Phe Asn Glu Ile Gly Phe Phe Asn Cys Thr Thr Lys Ala Ser
245 250 255

Asp Asp Glu Phe Tyr His Arg Ile Ile Lys Tyr Tyr Gly Lys Asn Arg
260 265 270

Ile Asn Asn Leu Phe Leu Pro Leu Tyr Tyr Asn Thr Met Arg Glu Asp
275 280 285

SEQUENCE LISTING.ST25.txt

Ser Leu Phe Ser Asp Met Val Glu Trp Val Asp Glu Asn Asn Ile Lys
290 295 300

Gln Lys Thr Ser Asp Ala Arg Gln Asn Tyr Leu His Glu Phe Gln Lys
305 310 315 320

Ile His Asn Glu Arg Lys Leu Asn Glu Leu Lys Glu Ile Phe Ser Phe
325 330 335

Pro Arg Ile His Asp Ala Leu Pro Ile Ser Lys Glu Met Ser Lys Leu
340 345 350

Ser Asn Pro Lys Ile Pro Val Tyr Ile Asn Ile Cys Ser Ile Pro Ser
355 360 365

Arg Ile Lys Gln Leu Gln Tyr Thr Ile Gly Val Leu Lys Asn Gln Cys
370 375 380

Asp His Phe His Ile Tyr Leu Asp Gly Tyr Pro Glu Val Pro Asp Phe
385 390 395 400

Ile Lys Lys Leu Gly Asn Lys Ala Thr Val Ile Asn Cys Gln Asn Lys
405 410 415

Asn Glu Ser Ile Arg Asp Asn Gly Lys Phe Ile Leu Leu Glu Lys Leu
420 425 430

Ile Lys Glu Asn Lys Asp Gly Tyr Tyr Ile Thr Cys Asp Asp Asp Ile
435 440 445

Arg Tyr Pro Ala Asp Tyr Ile Asn Thr Met Ile Lys Lys Ile Asn Lys
450 455 460

Tyr Asn Asp Lys Ala Ala Ile Gly Leu His Gly Val Ile Phe Pro Ser
465 470 475 480

SEQUENCE LISTING.ST25.txt

Arg Val Asn Lys Tyr Phe Ser Ser Asp Arg Ile Val Tyr Asn Phe Gln
485 490 495

Lys Pro Leu Glu Asn Asp Thr Ala Val Asn Ile Leu Gly Thr Gly Thr
500 505 510

Val Ala Phe Arg Val Ser Ile Phe Asn Lys Phe Ser Leu Ser Asp Phe
515 520 525

Glu His Pro Gly Met Val Asp Ile Tyr Phe Ser Ile Leu Cys Lys Lys
530 535 540

Asn Asn Ile Leu Gln Val Cys Ile Ser Arg Pro Ser Asn Trp Leu Thr
545 550 555 560

Glu Asp Asn Lys Asn Thr Glu Thr Leu Phe His Glu Phe Gln Asn Arg
565 570 575

Asp Glu Ile Gln Ser Lys Leu Ile Ile Ser Asn Asn Pro Trp Gly Tyr
580 585 590

Ser Ser Ile Tyr Pro Leu Leu Asn Asn Asn Ala Asn Tyr Ser Glu Leu
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Ile Pro Cys Leu Ser Phe Tyr Asn Glu
610 615

<210> 71

<211> 2112

<212> DNA

<213> Pasteurella multocida

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SEQUENCE LISTING.ST25.txt

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180

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780

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SEQUENCE LISTING.ST25.txt

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1140

ggtagtttct ttaaaactat tgatggcatt atggcctacc atcaagagcc accaggtaaa
1200

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1860

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1920

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